

A GUIDE TO GRADUATE STUDY

FREDERIC W NESS, EDITOR

This GUIDE is a project of the ASSOCIATION OF AMERICAN COLLEGES undertaken with the cooperation of the ASSOCIATION OF GRADUATE SCHOOLS in the ASSOCIATION OF AMERICAN UNIVERSITIES and with the aid of a grant from the FORD FOUNDATION

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GRADUATE STUDY

PROGRAMS LEADING TO THE PH D DEGREE

1957

ASSOCIATION OF AMERICAN COLLEGES

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PREFACE

The supply of college graduates who continue their formal academic preparation for careers in the learned professions is failing to meet the demands of industry, government, and higher education. Evidence of this fact is found on every hand. Advertisements in newspapers and trade journals for mathematicians and scientists, for example, have resorted to the blandishments of the hucksters in an effort to attract qualified personnel. In the field of college teaching, even our most conservative statisticians are predicting shortages which, within a decade, may well attain the proportions of a crisis.

Fortunately the nature of the problem is understood, even though its dimensions may still be in doubt. Efforts to find an adequate solution are mounting. With scarcely an exception, the major governmental and private organizations concerned with higher education and preparation for the professions are giving the problem serious attention. Some of the leading philanthropic foundations are supporting a variety of experiments directed toward its resolution.

As one phase of this nationwide effort the Association of American Colleges, with financial support from the Ford Foundation and with the cooperation of the Association of Graduate Schools in the Association of American Universities, has undertaken the preparation of *A GUIDE TO GRADUATE STUDY* for the use of the undergraduate and his faculty adviser.

The *GUIDE* is designed to serve several ends. First, it is intended to assist the undergraduate in planning, academically and financially, to meet the requirements for graduate study. Second, it attempts to give a realistic view of the educational and social life of the graduate student. Third, it provides some basis for making a wise selection of a graduate school. Finally, by indicating something of the professional opportunities open to the successful graduate student, it offers the implicit hope of encouraging our better qualified undergraduates to continue their training toward the greatest utilization of their abilities in a life of service to their nation and the world at large.

At the outset it must be said that the *GUIDE* is not intended to replace the wise and intimate counseling made available by deans, advisers, and faculty members in our undergraduate schools and colleges. From this source has come

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GRADUATE STUDY AND THE UNDERGRADUATE

Experience shows that the undergraduate usually has certain standard questions in his mind when he begins to canvass the possibilities of graduate study. In general these include the following: What is graduate study? For what professions or vocations is a graduate degree desirable? Do I have the personality, ability, and academic background to qualify for graduate study? How can I select the graduate school best suited to my capacities and needs? What can I do to gain admission to the school of my choice? How much will it cost and how can I meet this expense? What can I expect in graduate school? More particularly, what are the qualifications for an advanced degree?

In the ensuing pages an attempt is made to suggest answers to these, and corollary, questions. Although attention will be focused upon graduate study leading to the degree of Doctor of Philosophy in the arts and sciences, much of the discussion will be applicable to the master's degree and to other doctoral degrees as well.



The history of graduate education in the United States began virtually with the settlement of America more than three hundred years ago,¹ for graduate instruction was one of the earliest forms of education in this country. Walton C. John divides its development into three periods: 1, from 1642 to 1860 or the period of the supremacy of the master's degree, 2, from 1860 to 1900, or the period of the growth and development of the Ph.D., and 3, from 1900 to 1934, or the period of the great diversification of degrees on both the master's and the doctor's levels.² Since John's study was published in 1934 the question naturally arises whether still another period in this development has not arrived.

The present pattern of study characterizing most of our graduate schools of arts and science developed in this country only about seventy-five years ago in answer to problems which society, and consequently education, were facing at

that time. The problems besetting our world today, however, are vastly different from those of seventy five years ago, and from many sides the question is being asked whether our graduate schools have made—or indeed are able to make—the necessary readjustment. Thus if one were to characterize the current stage in the evolution of the graduate school of arts and science, he might well label it as a period of both dramatic growth and critical reappraisal.

For the most part this reappraisal concerns one of the primary functions of the graduate school—the preparation of college teachers. Here the criticism seems to focus upon certain specific deficiencies. In *The Graduate School Today and Tomorrow*, written by Dean F W Strothmann on behalf of The Committee of Fifteen—a group of outstanding educators, these deficiencies are summed up as follows:

1 graduate schools in their efforts to advance the boundaries of knowledge by research are at present not paying sufficient attention to a function they inherited by a natural historical process—that of providing effective training for college and high school teachers,

2 even the training in research often lacks the vitality necessary to produce humanely educated men and women capable of providing the moral, intellectual, and political leadership which a free society needs if it is to survive,

3 since the tidal wave of students expected to flood our colleges in the near future will enforce a change of some kind it is the responsibility of the graduate schools to see to it that this change will not create a chaos in which scholarship and scholarly teaching have become a mere memory

4 if scholarly teaching is to survive in our colleges—and we believe that non scholarly teaching simply isn't teaching—it should become the avowed purpose of graduate education to produce more people who are neither mere scholars nor unscholarly teachers²

Just what the result of the current ferment will be cannot, of course, be predicted, but there seems little doubt that graduate study in America is on the threshold of developments which may well be as dynamic as those accompanying the importation of German scholarship and scholarly methodology in the nineteenth century. Since the chief aim of this GUIDE is to help the student to understand and make use of the graduate school as it is at present, this passing notice at prospects for the future must suffice.

Another approach to an understanding of graduate study is to look more directly at the Ph D degree. For the history of graduate instruction in the United States is, in a very real sense, the history of this degree—which despite the emergence of a variety of other highly respectable doctorates is still the leading degree in the humanities, social sciences, and natural sciences. (Practices in foreign universities in the relative value of master's and doctor's degrees are frequently at variance with the system in the United States.)

Like many of our cultural and educational devices the Ph D is an European import. The first Americans to wear the purple emblem of its hood had to go to German universities for their training. The record shows that Edward Everett, in 1817, was the first American to obtain the German Ph D. By mid-century, some two hundred and twenty five Americans had enjoyed their *Wanderjahre*, many taking the doctorate—successfully undergoing the *Seminar*, the *Doktorarbeit*, and the *examen rigorosum*.¹ In fact the Ph D soon became ‘the badge of the finished scholar’.²

At the time of its incorporation into our own educational practice the Ph D was strictly an honorary degree. Begun by Bucknell University in 1852, this usage continued to be popular throughout the nineteenth century. As the use of the Ph D as an earned degree increased, its desirability for honorary recognition waned, and when the New York State Board of Regents outlawed it for institutions in that state, its usefulness was virtually at an end. The record shows, nevertheless, that the final honorary Ph D was awarded as recently as 1938 and that the report blank used by the US Office of Education in assembling its annual statistics on degrees continued to include a place for the honorary Ph D until 1946.³

The first earned Ph D at an American institution was conferred by Yale University in the year 1861, and the practice was gradually adopted by the other graduate schools. Even up to World War I, however, the American doctorate was considered inferior to those awarded by German universities. With the expansion of our graduate schools at the close of the war and with the ever mounting demand for Ph D’s in industry, government, and teaching, the degree has now achieved an indisputable place of distinction among the symbols of academic excellence.

There is an honest difference of opinion among many American educators as to whether the Ph D ought to be awarded in recognition merely of a substantial advance along the road to ultimate educational fulfillment, or whether, as in certain European academic systems, it should symbolize arrival at a Parnassian peak of solid accomplishment. Since the latter ordinarily calls for many years of preparation and effort and since the demand in our country for Ph D’s is overwhelming, the former concept is the one which dominates most of the doctoral programs in American colleges and universities. The Ph D, then, signals a high level of preparation rather than a lifetime of significant contribution, but, hopefully, it looks forward, rather than backward—to a career of enlarging usefulness.

This concept is succinctly expressed in the following words of Howard Mumford Jones of Harvard University:

The doctorate is conventionally the mark of the trained scholar, scientist and research

worker . . . For a permanent career in the college or university world, despite constant complaints by deans and presidents that this is so, a Ph.D. in the subject of one's choice is a prerequisite. It is also that mark of mature professional training required for a life-long career in industrial laboratories, governmental bureaus, some kinds of medical research, international organizations or other professional posts within the gift of government, industry, philanthropic organization, or professional association.⁶

What are the objectives of graduate study?

Since one of the first questions the prospective graduate student must ask himself is why he should go to the effort, time, and expense to attend graduate school, it is important to develop more fully some of the implications of the passage just quoted from Professor Jones. For graduate study requires substantial sacrifices from the student, and he has an obligation to himself to consider carefully its aims and outcomes.

That there is a tremendous demand for the highly trained specialist needs no iteration. John W. Studebaker, former United States Commissioner of Education, writing in 1939 said: "As never before, human welfare today depends upon the results of research, and upon the steady stream of scholars needed for the increasingly arduous demands of intellectual leadership. That unit of our educational system most directly responsible for stimulating research and for developing scholarly leadership is the graduate schools."¹ And certainly with the passing of World War II and of the Korean conflict, and with the advent of the Cold War, whose ending reaches into the unforeseeable future, this challenge to the American graduate school and to the young man or woman of superior intellect is, if anything, even more relevant than in 1939.

The distinguishing characteristic of graduate study in the arts and sciences, as against other types of professional training, is its emphasis upon the acquiring, preserving, and disseminating of advanced knowledge and particularly upon the advancement of knowledge through research, its evaluation, and application.² Regardless of the changes in methodology which may evolve in the present pattern of graduate education—a pattern which has not changed materially in seventy or eighty years³—these fundamental objectives are certain to be retained. For the survival of our way of life rests largely upon our maintenance of a strong, viable institution devoted to the extension of our knowledge and to its communication. The graduate school, in the eloquent words of Jacques Barzun, is "the keeper of Scholarship's conscience."⁴

This is not to say that the graduate school is not a professional school. A mere scanning of the fields of study included in the later pages of this manual will offer some concept of the great variety of professional areas for which the Ph.D. is becoming necessary.⁵ It is possible, however, to generalize to the extent of saying that a majority of the students currently enrolled in our graduate schools of arts and science are in one of the following three groups: 1, those

who will teach in college or secondary school, 2, those preparing for work in industrial laboratories, research institutions, government agencies, and business, and 3, those preparing for research careers in college or university departments¹²

In many vocations the Ph D is a *sine qua non*, in others, while not prerequisite, it is of primary importance to professional advancement. It has sometimes been referred to as the union card, particularly for college teaching, but this is, of course, a much too limited view to deserve serious notice¹³

Nor is graduate study intended for men only. For more than seventy five years women have been pursuing academic programs leading to advanced degrees, and the number is advancing rapidly in response to the demands for highly trained women teachers, research workers, and administrators. Currently an estimated 56 per cent of the male college graduates go on to the Ph D, in contrast with less than one per cent of women, but there is ample evidence that the girl student is increasingly looking ahead to a life of service through scholarship.

As for the variety of opportunities open to her, a glance at the list of living Ph D's from Radcliffe College shows a biologist and author of works on botany, a geologist in petroleum research, a Sanskrit scholar, a nuclear physicist in cosmic ray research, a pharmaceutical chemist, an anthropologist working for the United States Government, a research mathematician, a professor of biology in a co-educational university, a housewife, an astronomer, a social psychologist, an economic affairs officer with the United Nations, a musician, composer, and high school teacher, a curator of the Oriental library in a state university, and the distaff member of a wife and husband writing team.

For the relief of some natural apprehension, it should be pointed out that the attainment of a Ph D degree is no bar to marriage. One hundred and seventy five of the Radcliffe Ph D's who responded to a recent questionnaire (out of some 429 surveyed) are married, with 97 of these currently engaged in some form of professional activity. As might be expected the largest group of respondents were in college teaching, with the principal fields listed as English, economics, biology, and history¹⁴

It is worth noting, too, that a considerable percentage of graduate students are married. While the decrease in the number of veterans has resulted in a decline in the number of married students, many current candidates for the Ph D seem to combine successfully and happily their domestic with their academic responsibilities.

Thus, for men and women, for those of all races, nationalities, creeds, for all who share a love of learning, who have the capacity for high intellectual development, and who believe in a life of service of the highest order—for these

the American graduate school provides opportunity for a rewarding membership in the community of scholars

College teaching as a career

As has been indicated in the previous pages the three principal functions of the graduate school, in terms of its output, are 1, to train research workers and to carry on basic research, 2, to prepare experts for service in such nonacademic fields as business, industry, government, agriculture, and public welfare, and 3, to prepare men and women for careers in college teaching

Statistically, in relation to the majority of fields of study, the most important of these functions is the preparation of college teachers. It is generally assumed that from sixty to sixty five per cent of all Ph D recipients spend a major portion of their productive careers in college teaching, three fifths of them in undergraduate programs¹⁵ In view of these facts it is appropriate for this GUIDE to give some special attention to college teaching as a career. There is yet another reason for the emphasis—the impending crisis in higher education stemming from vastly increasing enrollments and the failure of teacher recruitment to keep pace. Here again statistics are useful. They provide at least a quantitative measure of the problem.

It is estimated that sometime between 1966 and 1971 college enrollments will reach seven million, or more than double their level in the mid fifties. If the present student faculty ratio of thirteen to one is to be maintained, as many as 500,000 new college teachers may have to be added to our present ranks to make up for losses and meet the necessary expansion¹⁶ (In one field alone—foreign languages—some 12,000 additional teachers will be needed by 1960.) This means that 'for every 10 college teachers now employed, somewhere between 16 and 25 new ones will have to be found between now and 1970'¹⁷ Or, expressed in another way, the present corps of instructors, variously estimated at between 150,000 and 268,000,¹⁸ will have to be expanded at the rate of some 25,000 a year in the next twelve years to meet the minimum requirements of higher education¹⁹

One of the questions which is now receiving the most careful consideration by both educators and citizens in general is where these new teachers are to be found. Of almost equal importance is how the present quality of college teaching can be maintained and even improved. No easy answers are available.

The statement was made above that from sixty to sixty five per cent of the 9,000 annual recipients of the Ph D go into college teaching. But statistics can be deceptive, in some fields, for example, relatively few Ph D's are currently entering teaching. The president of a major Midwestern university

INTERNAL FACTORS

Became so interested in subject I wanted to continue its study
Desired to work with college age students
Wanted a job with security and prestige
Felt I could contribute more to my field by teaching in college
Wanted an opportunity to pursue research activities in my field
Felt I could make the greatest contribution to society in this area
Liked working conditions (flexible schedule, vacations, relative independence, etc)
Wanted to be a part of the college academic and social life
Desired to emulate a certain college professor
Thought it would offer more intellectual challenge than other careers

While the completed survey will undoubtedly disclose other reasons and indicate the relative importance of those already advanced, this present list would seem to be fairly comprehensive. Furthermore one cannot help observing that among the internal reasons two seem to predominate: a deep interest in an intellectual life and an abiding desire to be of service to society on the highest level.

The importance of these motives is borne out by much other testimony. As Henry Brooks Adams once wrote, "A teacher affects eternity, he can never tell where his influence stops." The compensations accruing to the college teacher are many and varied. In the words of Dean Ben Euwema of Pennsylvania State University, the undergraduate who is considering college teaching

should know that he can spend a lifetime satisfying his curiosity and working with like minded scholars, that he will be working at his own speed, on his own problems, without very much outside interference or even supervision, that he will be a respected, if not a fluent, member of society, and that society needs him as never before.²²

A significant study could be made on the subject of why students do not go into college teaching as a career. Recently Harvard University and Radcliffe College gave their seniors an opportunity to endorse a large number of criticisms commonly made of college teaching. While the results have not as yet been published, some 18 per cent reportedly feared that teaching would "dig them into an intellectual rut," and 29 per cent disliked the "ivory tower detachment."²³

As anyone who has spent much time in teaching knows, these are not valid criticisms. Regardless of what it may have been in the past, college and university teaching is no longer a leisurely, protected, or withdrawn life. The good teacher is constantly revising and advising. He is in demand as a consultant. He participates actively in community affairs. He has many opportunities for broadening experiences through summer study or work. In short, he leads a

Per cent of new full time teachers by general field of teaching and by sex in 827 institutions in 1955-6 and 1956-7^a

General field of teaching	Total new teachers 1955-6 and 1956-7			Per cent of new teachers having doctor's degree		
	Total	Men	Women	Total	Men	Women
Agriculture	574	514	60	27.9%	30.9%	1.6%
Biological sciences	766	646	120	53.5	58.4	27.5
Business and commerce	843	640	203	10.7	11.3	8.9
Education	1,140	734	406	33.1	44.3	12.8
Engineering	1,322	1,304	18	11.9	12.0	
English	1,409	958	451	18.3	21.3	11.7
Fine arts	1,424	1,050	374	9.4	10.9	5.1
Foreign languages	530	345	185	31.1	35.6	22.7
Geography	81	70	11	25.9	27.1	18.2
Health sciences ^b	565	211	354	26.2	64.9	3.1
Home economics	347	17	330	6.6	41.2	4.8
Industrial and vocational arts	226	207	19	6.7	6.8	5.3
Journalism	73	61	12	4.1	4.9	
Law	107	100	7	29.9	31.0	14.3
Library science	284	104	180	3.9	8.6	1.1
Mathematics	715	566	149	23.4	27.6	7.4
Philosophy	178	169	9	44.4	43.2	66.7
Physical and health education	818	411	407	5.1	7.8	2.5
Physical sciences	1,194	1,086	108	44.8	47.3	19.5
Psychology	347	302	45	56.8	60.3	33.4
Religion	269	259	10	35.7	34.7	60.0
Social sciences	1,426	1,235	191	37.1	39.4	22.5
Other	7	6	1			
All fields of teaching	14,645	10,995	3,650	24.9%	29.9%	9.9%

^a This table and other useful data on the need for and supply of professional personnel in colleges and universities are available in a report by the Research Division of the NEA scheduled for publication in the fall of 1957. ^b Does not include dentistry and medicine.

more varied existence and has greater opportunity for developing a broad and flexible attitude toward life than is possible to the usual executive in business and industry.

But the most serious objection raised by the Harvard and Radcliffe students had to do with the salaries earned by college teachers. Here is a disadvantage

which cannot be glossed over. As compared, for example, with that of the medical doctor, the college teacher's salary is far from satisfactory. It is not, however, at the level of penury. Further, it is on a decided increase, an increase dramatically signalized by the Ford Foundation's grant of \$260,000,000 in late 1955 for the specific purpose of improving faculty salaries in private undergraduate colleges.²⁷

The most recent figures available at the time of this publication show that, while salaries of college presidents may sometimes exceed \$30,000 and teaching salaries of \$10,000 and above are not unknown, the average college president receives \$11,314, the average full professor, \$7,076, the associate professor, \$5,731, the assistant professor, \$4,921, and the average instructor, \$4,087.²⁸ Moreover, with so much national attention focused upon the problems of encouraging more of our highly qualified men and women to enter college teaching, it seems a safe prediction that the salary status of the profession will continue to make rapid improvement.

There is a well known, but probably apocryphal, story to the effect that when J. Pierpont Morgan was asked if a yacht was expensive, he replied, "Sir, if you have to think about the expense of a yacht then you cannot afford one!" While the problem of employment conditions in college teaching may not be precisely analogous, it is probably fair to assert that if anybody is primarily concerned with the size of salary, with the nature of the tenure program, and with the number and extent of the fringe benefits, he should not consider college teaching as a career. For teaching is, in the medieval sense of the word, a vocation—a calling. And those who enter it should do so with some sense of dedication.

Countless words have been written on the essential qualities of a good college teacher. So idealistic are most of these sketches that they make the majority of college teachers who read them self-conscious—if not downright apprehensive. They tend to frighten even the experienced teacher, let alone the neophyte. In general though, it would not seem an overstatement to expect the prospective teacher to possess, to a substantial degree, the following qualities:

- 1 emotional control and maturity
- 2 a strong drive and persistence
- 3 at least a B average intellectual capacity
- 4 a deep interest in students and other people
- 5 a vital enthusiasm for the subjects taught
- 6 imagination, inventiveness, and curiosity.²⁹

In addition to a knowledge of his subject, the teacher should have some awareness of the learning process, of the methods and techniques of instruction, of

the role of the college teacher, and of the history and function of higher education in American society.

As with many another art, there is always the question in higher education whether the good teacher is "born" or "made." Perhaps the answer lies in something of a compromise. Nor is this mere quibbling, for it reflects a diversity of views which have been debated in higher education since at least the time of Plato. A great majority of present college teachers learned to teach by teaching, and in the long run this is the only way to put on the finishing touches. The graduate schools of the past paid, and many of the present pay, little or no attention to specific preparation of their doctoral candidates for classroom duties. This is not to say that teaching experience in some form was not available in graduate school. On the contrary, Kidd's study (1956) discloses that approximately seven out of ten of the college teachers surveyed served as graduate assistants—but generally without any planned supervision. Slightly over four out of ten had some previous high-school teaching.³⁰

Good teaching is an art, and often an unconscious one. As Dr. Amos B. Horlacher has stated, "Probably the most dependable mark of a good teacher is his inability to explain *how* he does it."³¹ But it is an art which study, practice, and observation can refine; and since the great majority of candidates entering college teaching do so with only the most limited experience in the classroom, increasing pressure is being put upon the graduate schools to provide some specific training or orientation for the prospective college teacher.

One of the items included in the questionnaire through which data were collected for this GUIDE requested information about devices, courses, or programs designed to make the Ph.D. candidate a more effective college teacher. The replies—included under the heading of "Notes" at the end of the sections dealing with the individual graduate schools—are frankly disappointing. And yet, as indicated in the Strothmann report,³² there are some encouraging signs. More than twenty-five undergraduate colleges are currently sponsoring internships which include supervised instruction. Such institutions as Vanderbilt, Stanford, Rochester, and Syracuse are offering doctoral curricula with special emphasis on college teaching; and the same is true of the interesting experimental program conducted at seven Southern California colleges "to develop more broadly trained college teachers." Further, a major educational organization, the American Council on Education, has issued a statement of policy endorsing the teaching fellowship as a highly desirable means of developing "the professional skills sought in a college teacher."³³ The Association of American Colleges has two commissions concerned at least in part with the problem of improving the preparation of college teachers.³⁴

One of the professional associations, the National Council of Teachers of

English, has undertaken a detailed study of the problem of preparing college teachers—amounting to something of a pressure campaign. Among the suggestions which it is promulgating in the graduate schools are the following:

- 1 Keep reminding the student of aspects of his graduate study which have a direct bearing on undergraduate teaching
- 2 Courses should include discussion of textbooks in the field, as well as learned journals
- 3 Some attention should be given to standard undergraduate prejudices and preferences and areas of ignorance
- 4 Seminars should force the student's attention to matters of enunciation, delivery, correction of mannerisms, timing, and speaking from notes
- 5 Require the student in the seminar to conduct at least one recitation
- 6 Include questions on teaching problems in each examination
- 7 Provide an apprenticeship program for advanced students²⁵

This discussion has attempted to give a picture of college teaching by presenting certain data on supply and demand, by reviewing the reasons for electing—or not electing—a career in teaching, by indicating some of the usual characteristics of the college teacher, and by making some observations on the relevance of graduate study to the practice of college teaching. It has not as yet said to speak, except casually, of the incomparable satisfactions which accrue to the man or woman who spends his or her life in the service of higher education.²⁶ It would seem appropriate, therefore, to end this section with a passage from an address by one of America's great teachers, editors, and educational philosophers, Ordway Tead:

Here surely is one of the most obvious instances of a vocation which unites the inner and the outer concern for happy outcomes. Here your personal drive toward unique creativity can coincide with your contribution as a social benefactor because you are helping in the creation of other selves who carry forward the torch after you.

If you enjoy the life of the mind and of ideas, if you like the society of young people and get along with them reasonably well, if you are convinced that it is wise ideas that count and can be shapeful influences in the world—if all these conditions are true for you—teaching can be your dish.

It can be a superb career in which we at once maximize ourselves and transcend ourselves in dedicated service—and all of this in the effort to realize Godlike values in the world through the strivings of more better educated people whose education we have helped to forward.²⁷

The graduate school and research

The preceding pages have made the point that one of the primary functions of the graduate school is the preparation of college teachers. Another important function is the training of research workers. But the separation of teaching

and research is artificial and dangerous, for it is a basic principle in the organization of most doctoral programs that teaching and research must not be separated. Certainly the effective teacher must maintain a lively concern with research. The outstanding "researcher," however, need not necessarily be immediately involved with teaching.

Teaching is concerned with preparing the intellectual leaders of the future. Research aims at the increase of our present knowledge. Either without the other would be incomplete, if not ineffectual. Thus it is that at nearly every major university there are to be found scholars, sometimes called 'research fellows,' who rarely if ever enter the classroom, but whose contribution to the academic effort is nevertheless of great significance. Thus, too, the graduate school professor is frequently thought of as a man or woman more interested in research than in teaching. Yet his ardent pursuit of truth and discovery, through his personal or group investigations, may actually constitute the highest form of teaching. By his example he may inspire the students within his purview to a personal dedication which can result not only in their becoming better teachers but in their joining the ranks of discoverers themselves and adding to the rich storehouse of human knowledge. Therefore the graduate school, while concerned with the classroom, reaches its fulfillment in the library and laboratory as well.

'Research, in the concise definition offered by Laurence Foster, 'may be thought of as any conscious, systematized, investigative effort which has for its purpose the increasing of knowledge, through discovery of tendencies, principles, laws, methodology, or means by which knowledge or methodology may be verified.'²⁸ That the ability to function within this frame of reference is important for the college teacher is almost axiomatic. Teaching that ignores either the fruits or methods of research must inevitably become pedestrian.

Axiomatic also is the assertion that the beginning of wisdom is a love for discipline. Thus the following resolution adopted by the Association of American Universities at its forty ninth annual conference is worthy of repetition in this context:

The intellectual discipline and the exacting performance called for in the Ph.D. degree program at its best would seem to be more needed today than ever before. A candidate for this degree improves his scholarly capacity through investigations even though the results of his work may not be published. The experience gained in selecting and carrying out a piece of research has inestimable value for the student preparing for an intellectual career, whether as a research scientist, a worker in the social field, or a college teacher.²⁹

Among the values to be derived from training in research is the development of an inquiring and critical mind—a mind which does not take for granted but which probes, tests, and proves. For the college teacher, research assures adequacy of preparation, freshness of viewpoint, and enthusiasm for the subject—

with this last being the *sine qua non* of successful teaching. And for teacher and nonteacher alike, one of the greatest values of research is the tremendous sense of personal satisfaction which comes both from the mastery of a subject and from the pursuit of a problem to its ultimate resolution.⁴⁰

One of the first institutions in the United States founded primarily for the purpose of offering graduate instruction was Clark University in Massachusetts.⁴¹ An early president, G. Stanley Hall, laid down in 1902 a methodology for research which is fully applicable today.

First, the method must be either invented or adapted to the problem. There are conditions to be controlled, principles of selection must be determined, negative instances rejected, very often machinery must be devised and made.

Second, there must be data collected, experiments made and noted, facts gathered, protocol books filled, instances and experiments multiplied, and the basis of induction made broad and deep. The method must not be too precise and accurate.

The third and main stage is to think it all out, to apply a rigorous philosophic method, to reason logically on the objective facts, to find their unity, to determine what is central and what is unimportant, to relate and determine the place and bearing of all, and find whether the accumulations are mere agglomerations or have a meaning and value for science.⁴²

If on the face of it this seems to be a demanding regimen, then one can only say with Hamlet, 'Seems, madam! Nay, it is.' Furthermore the problems of the doctoral research project are in no way less rigorous than, nor essentially different from, those confronting the seasoned scholar.

In the first place, selecting a subject for a research project is difficult and sometimes perilous. It must be in an area that has not previously been thoroughly explored. Then, having found a topic either through his own investigations, or, if a graduate student, through the assistance of his preceptor on the faculty, the scholar must conduct a thorough search to make certain that it has not already been adequately covered. This search must include 'works in progress,' as well as those published, for more than one doctoral candidate has been obliged to discard months of labor and begin anew because some other scholar has beat him to the draw. Fortunately in a number of fields there are now annual publications of works either already in print or in progress.

Having selected the topic and made certain of its validity, he must next decide how it should be limited. Even doctoral dissertations sometimes reach a thousand pages in length, but this does not necessarily indicate superior worth. It may mean merely that the student did not properly limit his area of investigation. At the other extreme, a dissertation, regardless of field, may occupy only one page and yet it may well represent a significant contribution to human knowledge.

The next important task of the research scholar is to make a thorough canvass of sources and secondary authorities. It need hardly be said that the student engaged in research must go behind the textbooks with which he has become familiar in college, not because they are deficient in scholarship—most of them are excellent—but because his objective is the advancement rather than the dissemination or popularization of knowledge. He will find that the work of other contemporary scholars appears in scholarly journals, frequently printed in languages other than his own. In research there is no such thing as a foreign language. In the broadest sense the language of scholarship is universal, and thus the student may have to delve into the language of any area where men have shared his particular scholarly interest. In many fields he is assumed to have a reading knowledge of at least two languages and sometimes three or more. For example, a scientist investigating tropical diseases in which Japanese scholars have done noteworthy work may well have to read their reports in the original. An historian dealing with the history of Jordan would be handicapped if he lacked a knowledge of Arabic and perhaps of Hebrew. Sometimes the scholar may have to travel to foreign lands in search of new data through re-examination of documents, deciphering of archaeological finds, and development of new criteria for judging evidence.

The process of gathering information involves at least five steps: the recording of observations or information obtained from books or experiments, the classification of data, the testing of the information for its validity or credibility, the drawing of inferences as to the significance of new information, and the formulation of conclusions in a scholarly synthesis. In addition the investigator may have to evolve new methods of approaching his subject, like devising new experiments and fabricating the necessary equipment, or he may have to conduct excavations or travel in regions that have not been explored in former studies.

The manner of taking notes is of primary importance, and the scholar or graduate student who has not mastered an efficient system would do well to study one of the many excellent manuals available on the subject of preparing a research paper. One lost reference—and in this the present writer can speak with feeling—may mean many hours of painful search as the thesis is in the final stages of production. Bibliographical information should therefore be scrupulously recorded.⁴³

Finally, while doctoral theses are not generally expected to be examples of the finest in Attic prose, they are required to show adequate organization and effective presentation. Some dissertations see the light of day in published form. Many are unworthy of such treatment, not because their ideas or discoveries are not significant, but because they are poorly written. Even many

works of mature scholars suffer from awkwardness of expression

Through doctoral projects the graduate schools induct their students into the rewarding discipline of research. Although the job of research is difficult, it is not beyond the powers of the usual candidate for the Ph.D. It has many forms of interest and satisfaction, not the least of which is the joy of handling a manuscript and saying, "This is a little thing I wrote a few years ago!" And if the reviewers are appreciative, one's delight is complete.⁴⁴

Regardless of its methodologies or its delights, research in higher education is big business. In 1953-1954 colleges and universities expended for research a total of \$372,745,025, or some eleven per cent of their current budgets for educational and general purposes.⁴⁵ And the trend is toward more and more research as government and industry turn to the campuses for assistance in solving the inviolate problems of our complex civilization.

At one time a distinction may have been drawn between academic and industrial research, with the former leaning primarily toward the fundamental and theoretical and the latter toward the more immediately practical and applicable. But this distinction can no longer be reliably drawn. Another profound change in the concept of research is away from Johnson's Hermit hoar in solemn cell, Wearing out life's evening gray to the team of scholars or even to the jointure of institutions as represented in the Brookhaven Laboratories. For the intricacy of modern research, particularly in the sciences, has made the group approach almost inevitable. Moreover, research has developed a community of interest, as is evidenced by the organization of such groups as the National Research Council, the American Council of Learned Societies, and the like.

But the graduate student's first introduction to research, particularly in the humanities and social sciences, is likely to be as a solitary scholar charting his own course toward discovery. He may be fortunate enough to receive a research fellowship from a foundation, a professional society, or some industrial research interest.⁴⁶ But even if the award carries with it certain specific channel markers, he can still expect to enjoy the excitement of moving out into relatively uncharted waters.

Thus one of the prime functions of the graduate school is to provide basic training and experience in research, a function which has now reached major proportions. And from the standpoint of the graduate student, whether he is working in solitary splendor upon a doctoral project, or as one of a factory editing the papers of a major historical or literary figure, or as part of a team working on a sponsored scientific project, research can provide one of the major satisfactions of his advanced study as well as representing the culmination of his formal academic training.

Who should go to graduate school?

The previous section presented the assumption that graduate study and graduate schools have certain definite objectives. It would follow logically, therefore, that no one should undertake graduate training for whom these objectives are not plainly relevant. But determining this relevance and deciding to engage in advanced study are an undertaking of such magnitude as to justify some additional comment.

One of the trends of modern American education is to force the student to a vocational choice quite early in his academic life. The future M.D. who has not made his choice before his freshman year in college will find his already long period of training still further protracted. This applies as well to many other professions. In view of the prerequisites for nearly every field of advanced study, it is desirable for the undergraduate to come to a decision as early as possible. Failure to do so does not necessarily render him ineligible for graduate study, but it could result in his having to make up preparatory work he may have missed.

One of the graduate students questioned in the course of this study offered the following advice: "If you have done reasonably good work at the undergraduate level you have no reason to be afraid of graduate work. If you have an interest in some particular field and want to know more about it, then by all means continue your education. It means putting off many things that may seem important at the time, but in the end the satisfactions you receive in being able to give more both to yourself and to society more than compensate for any inconvenience."

In this admonition several important points are made. The first is that graduate study is not limited to the straight A student. Some undergraduates of quite respectable academic ability feel that graduate work is beyond their capabilities, while as a matter of fact many of them could engage in advanced study with success if not with distinction. As Professor Thorndike has expressed it:

There are two golden rules for choosing adults for further education: the rule of ability and the rule of interest. "Only the individual, of course, can judge the depth of his interest, but he would be well advised to give the admission committee of the graduate school an opportunity to make the final ruling on his ability."

While something more will be said on the subject of ability in the discussion

of admission to graduate school, it is relevant to note here that a certain type of ability is desirable for graduate study. Blegen defines it as the ability to solve problems. This involves a healthy respect for facts, for evidence, for principles, for laws, it requires fair evaluation and interpretation of data and the drawing of sound conclusions. "It certainly involves more than the ability to memorize, which only too frequently in undergraduate work is all that is needed for academic recognition.

Various attempts have been made to study the attitudes and characteristics which make for success or failure in graduate school. Friedenberg and Roth approached the subject from the sociological point of view, "Crombach examined it by administering the Rorschach test to some seventy five graduate students in education who had passed their preliminary examinations for the doctorate." Without doubt explorations will continue, but until some definitive answer is reached even the C student should not automatically eliminate himself from the possibility of graduate study. For he may well have unusual abilities which were simply not developed in his undergraduate experience.

A second important consideration in determining who should attend graduate school is interest in a particular subject field or combination of fields. While this interest may ripen and mature through advanced training, it must exist before the inception of graduate study. And this applies to interest in academic work in general as well as in a particular field of specialization. It may be perceived merely as a feeling of the inadequacy of the undergraduate major, it may be a more positive realization that the significant advances in the field of interest have occurred on the graduate level, with a concomitant desire, not only to receive such training, but also to play a part in advancing its invaluable contribution to human knowledge.

But interest in the subject and the ability to make a satisfactory average are still not enough, even though the student may have the industry, the thoroughness, and the courage to proceed to a mastery of the field. To these virtues should be added imagination, discrimination, a capacity to think creatively, and integrity in serving the truth. The unknown quantity for which graduate schools are continually searching is the steady glow associated with true lovers of learning.

From this one may deduce who should *not* go to graduate school. As every graduate dean is aware, a portion of his students come with no great zest for knowledge. For some, advanced study is merely the line of least resistance. For others it is a retreat from responsibility. In either case the results tend to be disillusioning. As a wise man once said, there is a time to learn and a time to live. Some people seem so occupied with the first that they never quite get to the second.

In some areas of endeavor, graduate study is not worth the equivalent of time spent in good, workmanlike participation in a business enterprise. Often the training program provided by a particular industrial organization is the shortest and most satisfactory road to a vocational aim.

There is this to be said, however: the baccalaureate degree is losing—if it has not already lost—its selective significance. Since the annual output of A B's now far exceeds the high school graduates of fifty years ago, the degree has become almost an accepted minimum for employment above the unskilled level. The M A too, has lost much of its earlier distinction, partly because of inconsistency and lack of agreement in its standard. In some phases of industrial or governmental service, the three or four years of sacrifice needed to obtain the Ph D are repaid many times in the advancement over those without the degree. Thus for the person with the ability and interest and zest, graduate study may well have material as well as intangible compensations.

In 1940 a survey was taken of 199 Ph D's in which the respondents were asked to indicate the chief returns realized from their investment in graduate training. A great majority checked increased professional skill (78 per cent). The next largest group checked the development of an "enriched philosophy of life" (55 per cent), and after this the attainment of a better position (53 per cent). Relatively few (25 per cent) pointed to a salary increase for the same work.²² The availability of other evidence of the salary benefits derived from the advanced degree may suggest that, at least with this group, financial returns were not considered especially important.

This would certainly seem to be borne out in the replies from graduate students who were asked, in the collection of information for this manual, to indicate their reasons for undertaking graduate study. Two of these replies are especially relevant.

The desire to continue in my effort systematically to organize and integrate experience to relate my acquaintance with my culture and myself, the need to increase my professional skills and my capacity as a person in order that I might make a more worthwhile contribution to my profession and to my community, the motivation to grow as a person so that I might have greater personal fulfillment, to increase professional mobility, status, earning potential and potential to make a professional contribution.

And this passage which might well serve as a manifesto for the ideal graduate student:

I have been interested in history and historical problems since secondary school. During my last two years of undergraduate study I realized that only further study and teaching at the college level would satisfy my own intellectual curiosity and desire to become an effective part of the educational process. I enjoy working among people attempting to understand some of those things which are the bases of our manner of life, thought, expression and purpose.

Believing in the ultimate perfectibility of man, I feel that the problems which beset us can be solved, for the most part, through thought and understanding. Unless each person is respected as an individual and given the greatest possible opportunity to develop his or her intellectual capacities, this goal can never be approached, much less realized. This to me is a great part of the role of teaching. Beyond this is my desire to contribute some small original bit to the sum of human knowledge in my own area of specialization and interest.

Obviously this discussion has offered no criteria for answering the question: Who should go to graduate school? Because of the great variety of motives and objectives, of personalities and abilities, no conclusive answer is possible. But clearly the prospective graduate student should ask himself many questions, not only about graduate study—for graduate study is not an end in itself—but also about the type of life for which graduate study is the entering way.

How to prepare for graduate study

Preparation for advanced study in such professional fields as medicine and dentistry is so highly standardized that the student rarely, if ever, is in doubt about the requirements for admission to professional study. Since he usually has decided at the outset of his college work what his goal is, he simply elects the 'pre med' or 'pre dent' curriculum and follows its specifications in sequential order. Regardless of which school ultimately accepts him, his prefabricated curriculum will very likely have included all the essentials.⁶³

Experience with graduate students in the arts and sciences, on the other hand, shows that they frequently do not develop a definite interest until they are well into their major field. Consequently they often arrive at the point of admission to graduate school with gaps in their major and minor preparation or with awkward deficiencies in foreign languages. The best way to avoid any such difficulty, of course, is for the student to reach a decision early in his college years. In the ideal situation this decision would include the choice of a graduate school. For then a careful study of the catalogue will enable him to chart his undergraduate program so as to include all the prescribed courses in his major and in allied fields.

Part two of this GUIDE is predicated on the assumption that for a majority of prospective graduate students this ideal situation does not prevail. By setting forth the prerequisites for admission, this manual affords a ready means of comparing the requirements of various institutions and departments and enables the student to plan a composite program to qualify him for any one of a number of graduate schools.

It is worth noting here that many undergraduate departments offer dual majors, one for the student whose formal education will end with the baccalaureate, the other for the student who expects to continue into advanced study. If there is any doubt in the student's mind, he should elect the more comprehensive program. Yet there is one caution to be offered here. From the deans, faculty members, and graduate students consulted in the preparation of this manual, an admonition was repeatedly given against too high a degree of undergraduate specialization. Although strong preparation in the major is obviously desirable, the time for intense concentration is in graduate, not undergraduate, school. For example, the chairman of one distinguished graduate department in English customarily disavowed the importance of any particular college courses in

the major field, stressing instead the necessity of a thorough knowledge of foreign languages. It was the responsibility of the graduate school, he said, to provide the requisite training in the major field. A student majoring in the sciences would do well to obtain a thorough grounding in the humanities and social studies. If he does not receive this training in his baccalaureate years, the chances are he never will. One student when asked in the course of the survey what advice he would give the prospective graduate student, answered the question by saying, "Read, read, read, read!"

Even in his major field, the undergraduate would do well to avoid too many of the purely practical courses. A broad experience with fundamental courses will afford him the best foundation for his graduate concentration. In psychology, for instance, many graduate schools prefer that the student not have too large a number of undergraduate courses in the field, especially technique courses."

What, then, should the prospective graduate student obtain from his undergraduate preparation? In addition to a firm foundation in his field of interest, he should acquire a grasp of one or more foreign languages to the point where they can be used as tools in research. As a result of the present status of foreign-language study in the United States it is the rare college graduate who has a mastery of even one language besides his own, let alone a reading knowledge of two or more. Most graduate schools, therefore, provide for the possibility of making up this deficiency after admission. In many it is a requirement for the degree rather than for admission to the school. A few, unfortunately, have relinquished the requirement altogether. Because so much scholarly work is written in other languages, a sound reading knowledge, even if it involves frequent recourse to a dictionary, is fundamental to thorough graduate training. (It is interesting to note in passing that while French and German are still the languages most commonly required, Russian is quite often listed as a substitute for one of them, usually for French.)

Important as possession of the language tool may be, there is an even more essential academic prerequisite for graduate study, and that is what might be called the proper frame, or habit, of mind. This is characterized by a strong desire, and the accompanying ability, to work independently. One of the principal differences, in fact, between the usual graduate and the usual undergraduate approach to education is the degree of individual initiative required of the student. This is partly, of course, a matter of natural aptitude, as discussed in the preceding chapter, but it may in large measure be developed by appropriate stimuli in the undergraduate program.

Fortunately the move toward greater independence is growing in our better colleges. The increase in the number of seminar courses, independent studies,

and honors programs is one of the most encouraging trends in modern higher education. While formerly limited to the upper two years, experiments in independent work are now appearing in the first two years as well. A probable by-product of this tendency is that many more students may acquire an interest in the possibility of pursuing graduate study.

In addition to the development of a certain habit of mind, properly directed individual projects help evolve skills in research techniques far beyond what is accomplished in the usual college term paper. This is of special importance since one of the major requirements for successful graduate study is a mastery of research techniques.

Nearly every college includes in its freshman orientation program or perhaps in its freshman composition course some minimal training in the use of the library. The prospective graduate student should build upon this knowledge to the point where he becomes thoroughly conversant not only with the general reference works in the field of his special interest but with methods of exploration throughout the highways and byways of secondary materials. This specification is not limited to students in the humanities or social sciences. The vast storehouse of scientific articles is of incalculable value to the research worker in the natural sciences—a value quite equal to that of the test tube and laboratory, and the time for him to acquire a knowledge of, and respect for, the scientific collection in the college library is during his undergraduate years. Toward this end a number of departments have instituted seminars in bibliography and research as required courses for the prospective graduate student or, in many instances, for all majors.

Before passing on to the final point to be raised in this section, some reference should be made to yet another skill which has a bearing upon successful graduate study—the ability to use the typewriter. In many graduate schools and programs written work in longhand is not acceptable, and not infrequently a graduate assistantship may actually hinge upon the ability to type. Thus, while this may seem a lowly concern, at least some minimal mastery of Mark Twain's folly seems essential.

But the final, and in some ways most vital, ability which the prospective graduate student should develop by the time he completes college is the ability to use the English language with accuracy, precision, and effectiveness. As with typing, this advice seems almost too obvious to deserve serious mention here, yet unfortunately even many English majors arrive in graduate school with but an uneasy control of the language. Thus to the prospective graduate student, regardless of his field of interest, we might well extend the advice given earlier to 'read, read, read' by adding with equal fervor "Write, write, write!"

How to select a graduate school

The selection of a graduate school should be made only after careful investigation and protracted thought. Practical considerations should, and usually do, override any idealizations. For example, a high percentage of the graduate students surveyed in this study reported geographical accessibility and financial advantages as among the compelling reasons for their choice. Nevertheless there are other important considerations, and it is the purpose of this section to review some of them.

Every graduate student would like to attend the 'best' graduate school. But what does this really mean, and how can he be sure? There is no up-to-date rating of graduate schools or departments, nor is there any organization which specifically accredits graduate schools. In 1933 an attempt was made by a committee of the American Council on Education to list graduate departments in order of merit,¹ and although the attempt was valiant and the methodology reasonably sound, the resultant furor was such as to discourage any further attempt from this source. President Emeritus R. M. Hughes of Iowa State College published privately in 1946 a somewhat less ambitious effort, with data valid through 1941-2. But both these ratings, regardless of their validity at the time, preceded the vast expansion and improvement of graduate instruction since World War II and are now completely out of date.

The absence of any accepted rating does not mean, however, that there is no reliable way of making a selection of graduate schools. As nearly every graduate student can attest, the advice of his undergraduate instructors can be of great assistance. Many colleges provide special advisers—often the dean of the college, sometimes a committee on graduate study. In some instances well organized programs are maintained. At Dickinson College, for example, a meeting is held early in the Spring for all freshmen who have attained an average of 'B' or better in the first semester. At this time general advice is given on opportunities available to the student with a graduate degree and suggestions made about the selection of courses and programs to meet graduate requirements. This is followed by meetings with juniors and seniors on such subjects as the selection of a graduate school, the mechanics of application, and the general nature of graduate study.

Another phase of this program is the maintenance of a selected library of graduate school catalogues and a subject field rating of individual departments

and schools based upon the collective experience of the current members of the college faculty. In addition, the office of the dean distributes a bi weekly summary of fellowship and assistantship opportunities.

Even in the absence of such a program, however, there are various sources to which the student can turn for information. The graduate school catalogue is obviously one of the most important. In many of the larger schools the graduate dean issues an annual report, copies of which are available upon request. Certain professional societies regularly publish in their bulletins information about academic requirements and facilities for financial aid. The annual reports of some of the larger foundations often contain information on special grants for graduate programs, by means of which some estimate can be made of the nature and quantity of the school's research activities. For the student who has the initiative to make an exhaustive study, a review of the *New York Times Index* can be rewarding, and as increasing attention is focused upon graduate study a wide variety of books and articles is becoming available. Some of these, of recent issue, are included in the selected bibliography appearing on page 60 of this GUIDE.

The graduate schools have their criteria for selecting students. It is equally important for the student to establish his own criteria for selecting a school. High on any list of criteria is the general reputation of the college or university which provides graduate instruction. The fact that no formal rating or accreditation of graduate schools is available in no sense implies that they are all of equal repute. The tendency of the recipients of awards under national fellowship programs to select a certain limited group of graduate schools is presumptive evidence to the contrary, if evidence were needed.

But there are certain cautions to be observed in selection by reputation. In the first place some of the more popular schools are also the larger schools, and for many students, particularly those from the smaller colleges, the very size may offer distinct disadvantages. Secondly, the fact that a university has a high reputation does not mean necessarily that each of its graduate departments is equally good. Many of the smaller graduate schools have developed unusually effective programs in particular fields of study. And finally the vagaries of academic life produce many changes, and the outstanding today may be the mediocre tomorrow.

More important by far than the general reputation of the institution at large is the reputation of its present faculty members, particularly those in the department in which the student is mainly interested. Here again, though we are dealing in intangibles, there are certain ways of arriving at an evaluation. For example, in judging a graduate school or department by its faculty—and there is no more important criterion—the prospective student can ascertain the fac

ulty member's productivity from such sources as the president's or the dean's annual report or from listings in such reference works as *American Men of Science*, *Directory of American Scholars*, *Who's Who in America*, *Who's Who in American Education*, and the like. In this the reference librarian can be of assistance.

Implicit in the foregoing is the view that the member of a graduate faculty, to a far greater degree than the teacher in an undergraduate college, is to be judged on the quality of his productive research. Thus it is important to trace his publications and the research projects with which he and his department are associated, as well as the special honors, elections, and awards he has received.

A graduate school is to be judged also by its alumni—the teachers, scholars, research workers, administrators whom, in fairly recent years, it has helped to train. A brilliant student is presumptive evidence of a brilliant teacher—and this may well be applied to the school as a whole. Here too the prospective graduate student may find source materials that will help in forming his judgments. For example, as reported in the bibliography to the GUIDE, various professional journals publish annual reviews of research in progress and the University Microfilms report on the yearly harvest of doctoral dissertations.²² The student would do well to review the catalogue of his own college and observe the graduate school origins of faculty degrees. Carrying this type of investigation to its logical conclusion, he would also survey the graduate school origins of various outstanding scholars in his field of interest. This might also include the authors of his favorite textbooks.

The would-be graduate student will want to know something about the students who will be his classmates and perhaps future colleagues. Though this type of information is relatively inaccessible, a study of catalogues, deans' reports, and rosters of fellowship recipients may shed some light. Graduate students are sometimes classified in two categories—those who merely hope to get a degree and those who are genuinely interested in scholarly pursuits. While no brief visit to a campus will enable him to make a clear distinction, the prospective graduate student might well attempt to catch the general spirit of the school by talking with some of its students.

This is the human side of the picture. But there is another side as well. This concerns what lies within the ivy-colored walls—the physical facilities for teaching and research. Thomas Carlyle once said that the true university is a collection of books, and while this is something of an exaggeration, it is an exaggeration of a fundamental truth. The graduate student, regardless of his specific area of concentration, must have a basic interest in the accumulation and preservation of human knowledge. Hence his concern with the repository of the best that has been thought and said by the great minds of the past and present.

Judging a library is not to be done lightly. The total number of catalogued volumes is not in itself a definitive criterion. Of greater importance are the breadth and depth of the collection in the student's particular field of interest. Of importance too is the number of learned journals in his field, and particularly the completeness of back issues. Of importance is the accessibility of other major libraries. Certain graduate schools and universities have arrangements with other institutions—as for example under the Farmington Plan—to avoid unnecessary duplications. Arrangements may often be made with nearby public or private libraries for the graduate student to carry on his research using their facilities. Thus a mere scanning of the card catalogue may result in an under estimate of the library resources available for intensive research.

Of equal importance to the graduate student is the accessibility of library materials. If he is denied ready access to the stacks he will be at something of a disadvantage. If he cannot obtain his own cubicle or carrel he may feel some frustration in the conduct of his work. A few of the more modern libraries provide sound proof areas where one can use the typewriter in taking notes and writing up data. Departments often maintain their own specialized libraries.

Obviously the library is only one of the facilities of importance to the young scholar and scientist. Laboratories, museums, scientific equipment of all kinds, cooperative arrangements with affiliated educational or industrial institutions—all these are of extreme importance. And here too the total plant and equipment may be impressive, but the student should examine closely the facilities which relate to his own field of interest.

In the section of the GUIDE dealing with the individual graduate schools an attempt has been made to indicate some of the special facilities available in the various graduate schools. But this listing is suggestive, not definitive. The student should consult the institutional bulletins and ask questions at the time he seeks admission. With the rapid expansion of university research facilities, even the latest bulletin is apt to be out of date.

It may be well to say here that many graduate schools are more than adequately equipped to serve students who are interested in pursuing work to the master's level but are deficient in resources for the additional work required for the doctorate. Although no rule-of-thumb guide can be offered to meet this situation, it is something which the student should consider.

This same caveat applies to the curriculum. The extent and variety of courses offered in the student's field of interest is obviously of great importance. But graduate schools as well as colleges are sometimes guilty of useless proliferation and consequent overlapping of subject matter. The number and diversity of courses is not nearly so important as the instructor who teaches them. Further,

number of graduate schools are now instituting programs of controlled teaching assistantships. Laboratory and field experience of course have a direct transfer value for post doctoral employment. It should be noted, however, that such work experience tends to protract the period required for the degree—a distinct disadvantage in view of the fact that the average time now spent in attaining the doctorate is six years (though not necessarily continuous years of full time study).

Finally, a most important consideration in selecting a graduate school is its practices and effectiveness in the placement of its graduates. As one college dean has expressed it, "The graduate student is usually not seeking an education! He is getting ready for a job by putting in the work for an advanced degree. In all fairness, he should know what school is most likely to further these ends."

There is not of course any common source where this information is available. The prospective student is certainly within his rights in asking what type of placement service is maintained by the institution and in expecting at least a minimal program. Regardless of his vocational objectives, he can anticipate needing some more or less permanent dossier on file, preferably in the graduate school placement office. Moreover, employers tend, in their search for professional help, to resort more readily to the type of school which maintains efficient and complete employment files. Thus, even though the student may not be able to obtain very specific information on the success of the graduates of a particular school in obtaining employment, he can form some judgment from examining the institution's placement services.

Throughout this discussion of selecting a graduate school the idea has been implicit that selection is important. It is—but not quite so important as it may sometimes seem. The fact is that with relatively few exceptions most American graduate schools do a competent job. The student who is capable can receive training of as high quality as he is willing to work for. The individual nature of graduate study makes this particularly true. In general—and especially after the first job—the prospective employer is more interested in whether or not the man has an advanced degree than in the institution from which he received it. Thus the intending graduate student should choose with care, but if he fails to gain admission to the school of his first or even second choice he should not be discouraged. The ultimate satisfaction he derives from his career and the contribution he makes to society will be just as great even if he has to be content with the school of his third or fourth choice.

How to gain admission to graduate school

Within a rather broad range it is safe to say that graduate schools are generous and flexible in their standards of admission. This is not intended to imply an absence of specific requirements. A glance at the admission criteria of two or three of the schools described in the second part of this manual will quickly dispel any such impression. A majority of graduate schools of arts and sciences, are, in fact, highly selective in their admission process, and as applications continue to increase this selectivity will very likely become even more refined.⁵⁹

Before discussing specific criteria of admission, one should draw a distinction, with particular reference to the Ph D degree, between admission to the school and admission to candidacy for the degree. In many institutions these represent two entirely different stages. Admission to graduate courses may be relatively easy, even to a program leading to the master's degree, whereas formal candidacy for the doctorate may require the passing of special qualifying examinations, the completion of language requirements, and evidence of a satisfactory level of competence in course work in the field of concentration. Furthermore there is some evidence that departments providing programs leading to the doctorate tend to be more exacting in the process of admission than those offering only the master's degree.⁶⁰ Again, in some schools the master's degree is reserved for matriculants who are to be discouraged, or prohibited, from continuing for the doctorate. In this situation admission requirements may be relatively light.

The usual requirements for admission to graduate school are "the bachelor's degree from a recognized college, university, or technical school, an undergraduate record showing competence, if not excellence, other evidence of promise of success as a graduate student, an undergraduate program which serves as a sound general basis for advanced study, including an adequate major."⁶¹

As for the required baccalaureate, a review of graduate school catalogues shows that a few institutions are willing to admit persons with outstanding qualifications even without the bachelor's degree. At Johns Hopkins, for example, it is possible for the student to begin work on an advanced degree after only two years of college study. At the Claremont Graduate School applicants may be admitted without the baccalaureate if they make satisfactory records on certain qualifying examinations prescribed by the school.⁶² Nevertheless the bachelor's degree is usually prerequisite for admission to graduate study.

A number of the college students questioned in the preparation of this manual asked about the importance of the particular undergraduate school in gaining admission to graduate study. Perhaps the best answer to this question is to look into history. There was a time, not long ago, when many of the leading graduate schools gave preference to graduates of colleges accredited by the Association of American Universities. Under a grant from the Carnegie Foundation for the Advancement of Teaching, a study was made of the graduate school records of students from the accredited, as against those from the unaccredited, colleges. The results indicated a difference so slight as to fail to justify continuance of the AAU listing.⁴³

It is true that a number of universities tend, on the basis of experience with graduates, to favor certain undergraduate schools over others. This does not mean that others are not acceptable but only that the records of applicants from the less preferred schools may be more carefully scrutinized. Some colleges do seem to have outstanding success in the number of their graduates who continue for the doctorate, but there is no conclusive evidence that their alumni enjoy preferential treatment either in admission or in the awarding of scholarship or fellowship benefits.⁴⁴

A study of current graduate school catalogues shows that the usual minimum college average expected of the applicant for admission is a 'B'. This is not necessarily a cumulative average for all undergraduate courses. More frequently it is the average for the work of the junior and senior year or for work in the field of concentration. Some of the schools specify the number of 'A's,' 'B's,' or 'C's', some reveal different standards in different departments, some different standards for in-state and out-of-state students. Some are concerned with class standing—upper half, upper quarter, and the like—rather than any set numerical or letter grade or average, others do not spell out any specific requirement but make a statement such as the following: 'previous work must be of sufficiently high calibre to meet the minimum requirement, namely a record of marked distinction.' Many schools are willing to grant provisional admission to the student below the minimum required average, if in other ways he indicates promise of success in graduate study.

The general assumption is that if the student receives few 'A's' or 'B's' as an undergraduate he will make few or none in graduate school. This does not mean that an 'A' undergraduate record is required. Such a record might indicate only an unusually facile memory or excessive intellectual docility. At Radcliffe College, for example, the straight A applicants are checked carefully for evidence of emotional stability in order to find answers to such questions as: Can they accept a lower grade—their first—without going to pieces? Can they adjust to the fact that competition is keener in graduate school, and

that not everybody can achieve 'A's'?"⁶³

In addition to this quality requirement, a great majority of graduate schools or departments expect the applicant to have completed a major in the field, or at least to have taken successfully a specified group of courses in the area of his graduate interest. These specifications may, and often do, include courses in related fields and the acquisition of certain tool subjects. It is important to note that the student need not necessarily have formally completed a major as such, so long as he demonstrates sufficient competence in the minimum hours or the courses specified in the field.

At the risk of repetition, a few additional comments are relevant here on the subject of foreign languages, for a study of the catalogues suggests that this is a rather confused area. In some graduate schools or departments the language requirements must be satisfied by examination on admission. If scores are unsatisfactory, the student may be admitted but he will suffer the possible loss of graduate credit if he does not meet the language requirement by a specified date. In some schools the tests may be little more than a formality, in others they are very searching and represent a major hurdle. They usually include, or are composed exclusively of, sight translations, often of passages taken from books or articles in the student's field of interest. In a few instances he may be permitted the aid of a foreign language dictionary. In general the languages required are French and/or German. Recent trends show Russian widely accepted as a second required language, usually as an alternative to French. Other languages, classical or modern, are prescribed in many programs. Some graduate schools, however, permit as an alternative achievement the substitution for the second language of 1, a more thorough knowledge of the first language, 2, a series of courses which, in effect, represent a third minor, or 3, some other skill, such as a competence in the use of a mathematical tool or a system of measurements.

Another variable factor in the selection process is the use of letters of reference. While practice varies in the number of letters required, many schools ask for two or three. Here the best advice is for the undergraduate to earn the respect of his senior undergraduate professors, including his departmental chairman. For this man or woman in particular can be of immeasurable help to him in gaining admission to graduate school.

Finally, a number of graduate schools or departments require some form of qualifying examination in the admission process. Since such requirements vary from one school to another, and from one department to another, the student will have to determine for himself the practices of those in which he has an interest. The information in the second part of this manual can be of help. It gives an indication of what examinations are required, although it does not in-

clude the dates when scores must be submitted. This information will have to be obtained directly from the school concerned. Some graduate schools ask the applicant to take tests devised and administered by the school itself. If he can not conveniently come to the campus, he can often make arrangements to take the test at another center, frequently at his own college.

More and more graduate schools are requiring applicants for admission to take certain examinations which have been made available for this purpose by testing agencies operating on a nationwide basis. For the most part these agencies provide descriptive bulletins containing information about the nature of the tests and instructions on how to take them. Since two such examinations have come to be the most widely used, it may be well to discuss them briefly.

One, the Miller Analogies Test (MAT), has been described as a high level test of scholastic aptitude appropriate for advanced students. It is a fifty minute test of information and reasoning ability based on verbal analogies. It yields a measure of verbal ability which has been found to be one of the most important factors contributing to success in graduate study. The MAT is published and controlled by the Psychological Corporation, which has made it available under carefully controlled conditions in testing centers in certain colleges and universities throughout the country. The student who is required to take the MAT by the graduate school to which he is applying for admission may take it at any of these centers and have his score sent to the school (or schools) which he designates. A number of studies have shown that scores on the MAT are positively related to success in graduate study in a variety of fields.

The Graduate Record Examinations (GRE) are offered in the National Program for Graduate School Selection in testing centers throughout the United States and certain foreign countries four times each year—usually in November, January, April, and July. Candidates register in advance with the Educational Testing Service (Princeton, New Jersey or Los Angeles, California) to take the test at the most convenient center.⁶⁶

Since the GRE offers both the Aptitude Test and a series of advanced tests, candidates must ascertain from the school of their choice which they should take. The former is a two and one-half hour test of scholastic ability which yields two scores: verbal ability and quantitative (or mathematical) ability. Each of the advanced tests is a three hour achievement test designed to measure the applicant's comprehension of the materials basic to success in the field of his intended graduate major. A candidate may take any one of the following sixteen advanced tests: biology, chemistry, economics, education, engineering, French, geology, government, history, literature, mathematics, philosophy, physics, psychology, sociology, and Spanish. The GRE are also used by certain national and regional agencies in evaluating the qualifications of applicants for graduate fellowships.⁶⁷

One use of these qualifying examinations which deserves special notice is their prescription in cases of doubtful qualifications or provisional admission. Frequently the recommendation form which the graduate schools ask the undergraduate deans or chairmen to fill out asks whether the candidate is recommended with or without a specific qualifying examination. Where the candidate gives evidence of not having performed up to his capacity in his undergraduate work, the recommendation usually calls for the examination. Or again in many graduate schools where the applicant has not quite achieved the minimum required average or has not completed some of the recommended or required courses, the qualifying examination is specifically requested.⁶⁸ At the present time the tests are used more frequently by individual departments than by graduate schools as a whole.

It is important to point out that there is no such thing as a passing grade in the qualifying tests whether the GRE or the MAT. From a survey of graduate school practice, however, it appears that a score below 400 on the GRE generally results in the student's being discouraged either from admission or from continuing with graduate study. The score on an advanced test must usually be much higher. For example, one school indicated that a score below 600 in Physics did not warrant financial support, below 500 made admission questionable.⁶⁹

No test has as yet been devised which measures all the multiplicity of qualities with which the graduate schools are concerned. Many institutions qualify their use of these measures as not the primary criteria but as helpful supplementary information when in doubt on the basis of other criteria.⁷⁰

For the most part this discussion of admission procedures has been limited to the student who is applying directly from his undergraduate college. A considerable number of students, however, attend one institution for their master's degree and transfer to another for the doctorate—a procedure which has some disadvantages but many advantages. It certainly calls for caution on the part of the student, for as is evident from information contained in the second part of this manual, a wide variety of practices is followed with students who transfer. Many schools place a strict limitation upon the number of transfer credits they will accept. For the master's degree it is customary to recognize not more than six or eight credits, for the doctorate not more than two years of work done elsewhere. Some institutions will grant no transfer credit if the student cannot satisfy his foreign language requirements at the time of transfer. Because of the diversity of practice, no general advice can be given except for the student to make a careful investigation of requirements before seeking to transfer to another institution.

It is appropriate, in closing this section on admission to make a few observations on how, where and when to make application. Although many schools,

as is evident in the second part of this manual, do not designate a specific dead line for application, one of the greatest mistakes the prospective graduate student can make is to apply too late. A few schools specify a period in which the application blank must be requested as well as the final date for its receipt. It is also important to note that the time for application for admission does not necessarily coincide with the date for application for financial assistance. Ordinarily the student is not eligible to apply for aid until he has at least initiated the admission process. A large number of graduate schools have agreed on a common date, April 1, for announcing financial awards. No such common date exists, however, for informing successful candidates of their acceptance. It is highly advisable for the applicant to begin his inquiries in the early Fall of his senior year.

Because of the differing organizational patterns in graduate schools, no uniformity exists in the office to which the applicant for admission should address his request. In the larger universities the application must usually be made either to the graduate school dean or the department head, and the same is true of applications for assistance. For this latter purpose a distinction is sometimes made in the type of assistance. For example, applications for fellowships will go directly to the dean, whereas applications for assistantships will go to the chairman of the department. In the smaller universities the practice is generally for the application for admission to be made to the graduate school or the admissions office. Individual practices are detailed in the separate entries in the second part of this GUIDE.

How to finance graduate study

Any word of advice on the problem of finding funds for graduate study should be preceded by 'after you have chosen your graduate school——' The selection of the most appropriate school is so important to the student's academic and scholarly future that consideration of financing the three years of study leading to the doctorate should always be secondary since he will find that every graduate school has some means of aiding its students. He will also find, if he has distinguished himself in college, that some very liberal allowances are offered to attract outstanding students. The prospective graduate student who compares offers of support and decides solely on the basis of the largest stipend is scarcely doing justice to his own career. And, ironically enough, he is frequently surprised to find a number of strings attached to what looked like a particularly generous offer of financial aid.

To begin with, financial aid is given in a number of ways. Graduate schools offer fellowships, teaching and research assistantships, loans, and part time employment on the campus, as well as remission of tuition and fees. Outside agencies, such as private foundations, government agencies, professional associations and industrial corporations, offer fellowships and, less often, loans. It is often necessary to combine two or more sources of funds since even the more liberal fellowship stipends are often not adequate to cover all expenses for graduate study in most parts of the country.

Fellowships—within the university

Fellowships awarded within the university include endowed fellowships, awards assigned to the school by industrial corporations or private foundations, and awards made from the school's operating budget. These fellowships carry stipends for the support of the student without, ordinarily, requiring any services. (In these circumstances, the stipend is normally considered non taxable by the Federal Government.) One application form is often sufficient for all the awards which the school administers, and the deadline for receipt of appli-

This section was contributed by L. Virginia Bosch, assistant to the president, University of Wisconsin. Miss Bosch is director of a companion project of the Association of American Colleges and the Association of Graduate Schools for publication of a directory of fellowships available to graduate and postdoctoral students.

cations is usually in February or March preceding the academic year in which the fellowship will be effective. In accordance with a resolution adopted by the Association of American Universities, many graduate schools cooperate in the practice of sending out notices of appointment to graduate fellowships for each academic year on, or not before, the preceding April 1, and of informing each prospective fellow that he has until April 15 to accept appointment.

Applications are usually considered by a fellowship committee composed of faculty members. The applicant is judged on merit, but he is frequently requested to give information about his own and his family's financial resources. Stipends are adjusted to need unless the terms of the fellowship specifically fix the level of stipend. The amount may range widely, from less than \$100 to more than \$2,000. The award is often augmented by remission of tuition and fees: the school excuses the student from payment of normal tuition while he holds the fellowship, and sometimes forgoes other fees as well.

University administered fellowships are usually granted for one academic year, sometimes with a possibility of renewal. The student must maintain a good academic record and show scholarly promise in his field in order to retain the fellowship.

The US Office of Education issues a booklet called *Scholarships and Fellowships Available at Institutions of Higher Education*, listing data which it obtains by means of questionnaires sent to colleges and universities. This is a useful compilation of awards offered by schools themselves, but awards are continually being added in all schools and first hand information should be requested.

Fellowships—from outside sources

The terms of fellowships for graduate study offered by private foundations, government agencies, industrial corporations, professional associations, and other organizations are almost as numerous and varied as the donors themselves. Some fellowships offered by government agencies in the sciences feature graduated stipends for each year leading to the doctorate and several additional allowances. Other fellowships are largely honorary and carry only a small stipend. All outside donors of fellowships are looking primarily for quality in candidates, and most awards are highly competitive. Most awards are also limited to specified fields of study.

Notices of fellowship awards for which first year graduate students are eligible are sent to the deans of colleges and may usually be found posted on the bulletin board.

Deadlines for outside fellowship applications begin in the September preceding the academic year in which the awards are effective. Deadlines continue to

occur during October, November, December, and sometimes early January Awards are announced in March or the beginning of April, usually before universities announce their own awards

Application is usually by form A statement of the applicant's plans for graduate study and for his future career must be included The donor will also request a transcript of the college record and several letters of reference from college teachers as well as personal references A statement of financial resources may be required and the stipend may be adjusted accordingly The donor may also ask the applicant's rating in the Graduate Record Examinations

Methods of choosing recipients of fellowships include review by an advisory committee of professionals in the fields covered by the fellowships, screening by an official of the foundation or agency giving the award, or a combination of several types of review Major consideration is given to the college teacher's evaluation of how much ability the candidate has for graduate work and how well developed are his plans for his own future A personal interview may be required and questions will be asked along the lines of 'Why do you want to do graduate work? What is the specific area of your field which interests you most? What courses in other fields do you think you need to round out your preparation? What do you want to do after you get your degree and what are the reasons for your decision? Even though his plans may change in the course of his graduate study, the applicant is expected to demonstrate that he at least has the ability to think these problems through

At the present time fellowships from outside donors generally carry a stipend ranging from \$1,000 to \$3,000, and even higher for a few special awards To this may be added an allowance of \$200 to \$350 for each dependent, an allowance for books, or some travel money for the fellow to reach the graduate school of his choice Tuition and fees may also be paid (Sometimes the university will remit tuition and fees for holders of outside fellowships when this allowance is not included)

Some fellowships carry the provision that no other fellowship may be held at the same time, and some forbid any other income producing activities Government awards prohibit the holder of a fellowship from receiving other payments from other Federal Government sources, such as contracts or G I benefits

A true stipend from a non profit organization is usually considered non taxable, within certain limitations, by the Federal Government Individual cases should always be referred to the local office of the Bureau of Internal Revenue for an opinion

The outside sponsored fellowship often carries a great deal of prestige in the fields in which it is given and is a definite advantage in applying for a position later

Assistantships

Most universities offer two types of assistantships teaching and research. Both are awarded on the basis of ability but the factor of need is often taken into consideration. Assistants are usually appointed in their major departments to aid the faculty in their professional duties. Some graduate schools limit the time an assistant may work to a maximum of 15 or 20 hours a week with a full program of courses, others will not permit his carrying a full course load. Teaching assistants may expect to be required to grade papers, conduct quiz and lab sections, teach elementary classes in their fields, prepare materials for class demonstrations, and a host of other duties limited only by the judgment and imagination of the professor with whom they work.

The advantages of holding a teaching assistantship are the variety of professional experience it brings, the fact that teaching assistants are frequently listed as staff members and enjoy some faculty privileges, and the fact that the assistant can present a teaching reference when looking for his first full time position. One of the reasons why teaching assistantships may not be desirable for the full period of graduate study is that the amount of time necessary for class preparation and the correcting of papers for courses which the assistant teaches sometimes becomes rather excessive and he may have to reduce his own course load. Indeed the rules of the particular graduate school may prohibit the assistant from carrying a full program.

Research assistantships are found most often in the natural sciences and for the most part require laboratory work. The professor for whom the research assistant works often has a grant or contract to support his investigations and the problem for study has been described and the method outlined. The main advantage of a research assistantship is that the student is often permitted to work on some phase of the problem which he can use for his dissertation. He also receives sound training for future independent research of his own. There is a possible disadvantage in being connected with government contract research if there is any question of the student's dissertation being classified as secret by the government and publication rights refused. It is usually possible, however, to find this out in advance. Occasionally there is also the disadvantage of being assigned to an applied research project which provides very limited training.

Both teaching and research assistants are usually paid by salary in amounts which may range from a little over \$1,000 to well over \$2,000 for an academic year. Since this is payment for services it is usually considered taxable income. Enquiries about assistantships should be made to the department in which the student is interested.

It should be noted that many graduate schools do not accept applications for assistantships from first year students. Because of the responsibility connected with such an appointment, it is often necessary to complete one or two years of graduate study before becoming eligible to apply.

Loans

Most universities have funds from which it is possible to borrow a limited amount each year, either on an emergency basis or for a longer term, at a low rate of interest. Some loan funds provide for a reduced rate of interest—one, two, or three per cent—while the student is still in school and a higher rate on the unpaid balance remaining after graduation. Other schools are able to permit the student to defer payment entirely until after he has received his degree and has an income.

Some of the smaller, local foundations also offer loans to students on terms similar to the university's, or sometimes more liberal. Banks generally find loans for education a good risk, but their interest rates are of course higher. In several states non profit corporations or other legal mechanisms have been set up by the state to guarantee loans made to students by commercial banks and thus encourage lower interest rates. The office of the state commissioner of education provides information where such arrangements exist.

Part-time employment

Unless the full time student has a special skill which is in short supply in the community where his graduate school is located, he will probably find part time employment outside the university too great a drain on his time and energy for the amount of wages he will receive. In any event it is advisable to investigate opportunities within the university first for the sake of their double advantage: salary plus some kind of professional experience. Besides assistantships, most large universities employ senior house residents for the dormitories. There are sometimes opportunities for resident tutors or counselors. These arrangements offer board and room and sometimes salary as well. The student employment office or dean of men's office is usually the source of information about such positions.

Summary

Since there are a number of ways of financing graduate study, it is important to plan carefully to take advantage of the types of aid which are best suited

to the student's academic and vocational objectives. At the time of filing application for admission to a graduate school it is well to request information and application forms for financial aid if such assistance is needed. The college dean's office can help with information about externally sponsored fellowships, and this type of application should be prepared very early in the senior year. The dean will also have information about fellowships offered by the college itself to its graduates and about awards from local foundations. The student should also consult his major professor about his plans—an excellent source of advice in deciding what to include in an application.

Today more than ever this nation realizes that its greatest wealth lies in its human resources, in the cultivation of talent and the training of skill. That is why more and more help is becoming available for students with the ability to pursue graduate study and the willingness to make the sacrifices necessary to develop that ability to the point of maximum usefulness. It is very rarely, therefore, that the talented student cannot find the necessary financial resources for the nurture of his talent through advanced study.

What to expect in graduate school

Uncertainty seems to be the greatest problem for the new graduate student. Anxiety, often purely from imaginary sources, plagues him about courses, grades, requirements, the difficulty of the oral examination, the bugaboo of the thesis, and so forth. Other graduate students are not necessarily reliable sources of information. Members of the department are often vague and casual concerning precise problems which worry him. Precision in departmental orientation and the assignment of capable advisers who can and will take the time to help the new student are, perhaps, the best palliatives.

This observation by a graduate student currently working for his Ph.D. degree seems a fitting prelude to this final section on 'Graduate Study and the Undergraduate'. Although the previous sections have considered various aspects of graduate study, from purpose and preparation to admission and financing, they have made little or no effort to describe what the student can expect to experience when he launches upon the arduous, but rewarding, journey toward the doctorate.

Transition from college to graduate school

The transition from college to graduate school is not always easy. The general opinion seems to be that it is easiest if the student enters graduate training immediately upon completion of his baccalaureate. By so doing he presumably brings unabated the skills and knowledge acquired as an undergraduate. A long interruption may require him to re-form successful study habits, to say nothing of renewing his grasp of the fundamentals of his field of concentration—all this at a time when he should be making the best possible impression upon the professors who will play a vital role in his future career. On the other hand, if the period of absence from academic work involves the gaining of practical experience in the area of his interest, this may be of decided benefit in the enrichment of his graduate study.

The student who is entering graduate work at the same institution where he received his undergraduate degree may find the transition relatively painless. A study of catalogues of the institutions included in this manual shows that fifty one of them offer combined graduate and upper level undergraduate courses in some, if not all, of the departments. Thus he may already have completed some of the courses prescribed in the graduate curriculum. Even if he has not, he will

undoubtedly have made acquaintance with a substantial number of the professors in his department. For him the transition—at least academically—would be a mere formality.

The student who is entering graduate school at an unfamiliar university could help ease the transition by spending a few days on the campus before the close of his undergraduate program. Among other things for him to do on any such visit is to obtain a clear understanding of what will be required of him academically. If he discovers deficiencies in required courses or in languages, he can profitably spend the intervening summer months in an effort to compensate for these arrears.⁷¹ He can also look into housing facilities and perhaps secure accommodations in advance so that he will not have this worry at the time of registration.

Graduate study is, in a sense, merely the extension of undergraduate work in the direction of specialization and research. The first few days of the graduate student's life, accordingly, have many things in common with the period four years earlier when as a freshman he underwent that first major change in his academic experience. The transition to graduate school is usually not nearly so great as that from secondary school to college. Many familiar procedures recur. The student will be required to register, to fill out a bewildering variety of forms and of course to pay his fees or at least make arrangements for their payment. If he has not already submitted scores on a qualifying examination he may be asked to take some local or national aptitude or achievement tests for guidance purposes.⁷²

After a relatively brief time, however, he will begin to perceive that the differences are far more significant than the similarities. One of the things he will discover at the outset is that, while American colleges and universities are usually conscientious in providing adequate accommodations for their undergraduates especially freshmen, a majority of them do relatively little for the graduate student. It would appear from the descriptions of residence facilities under the individual entries in the second part of this manual that the situation is improving, but still a large percentage of graduate students must make their own arrangements for rooms, meals, laundry, and other personal services.

Social life in graduate school

Another contrast which the student will quickly discover is that he has left behind the expansive social life he enjoyed as an undergraduate. Even if he remains at the institution of his baccalaureate years and continues to eat at his social fraternity house, he will very shortly find that he has little in common with his brothers. His graduate study will leave him scant time for leisure and

his interests will become so highly specialized that he will tend to seek the company of others with the same concerns

This is not to say that graduate school provides no opportunity for social life. At Cornell University, to take one example, there are some twenty five graduate clubs which include social events in their programs, but for the most part these clubs are organized along departmental lines and are devoted to the advancement of their members' professional interests. Tulane University sponsors more than one hundred extracurricular activities and organizations for the graduate student, administering them under the direction of a Dean of Students. The University of Virginia provides a Graduate Students' Center, and at Yale University it has been the practice for many years to hold regular departmental teas, cocktail parties, and picnics, supplemented by occasional afternoon teas in the graduate lounges. Harvard maintains a Graduate Student Council to organize a recreational program and even boasts of a Society of Harvard Dames for wives of graduate students. But though these examples could be multiplied, the important fact is that the new graduate student who has just emerged from the extracurricular whirl of the typical undergraduate campus will find his social activities in graduate school almost ascetic by comparison. What is lacking in breadth, however, is compensated for in depth. He will find that his contacts with professors and fellow students will be characterized by an intellectual excitement and verve lacking in all but a precious few of his undergraduate experiences.

Counseling and guidance

Another striking contrast is the freedom which the student enjoys in the pursuit of his own academic interests. Whereas a majority of undergraduate colleges maintain fairly extensive counseling facilities, the graduate student will find a minimum of guidance. In one of the larger Eastern universities, for example, it is reliably reported that to see certain of the faculty members, a student must make an appointment a month or two in advance. In 1943 Walter A. Jessup, then president of the Carnegie Foundation for the Advancement of Teaching, wrote: "Despite all our talk of the comradeship of scholars, our graduate students in general encounter far greater difficulty in achieving and maintaining fruitful personal relations with the staff than students in medicine or law."¹³ This rather serious indictment calls for some additional comments.

Graduate schools have traditionally avoided excessive paternalism. The student is presumed to have ability, initiative, and maturity. He should not need the amount of guidance that he needed as an undergraduate. If he does—and this is not necessarily to his discredit—he should consider the desirability of

attending one of the smaller graduate schools where more individual attention is often available. Certain deans, particularly of graduate schools in the larger metropolitan areas, however, are coming to realize that a little more guidance may be desirable. Columbia University, for example, has established the office of Graduate Student Adviser, and Dean Barzun announced in his 1956 annual report the preparation of a *Graduate Student Guide* to assist in the orientation of the incoming student.¹⁴ An increasing number of graduate schools provide some form of service for psychological and vocational counseling, even though this service is usually university wide rather than exclusively planned for the graduate school or schools. A rather common pattern is for the department to have a graduate adviser who represents the graduate school in every academic aspect of advising the student on his program, alternatively, in some institutions the student is placed at the time of registration under the direction of a committee to arrange his program of studies, conduct his examinations, and so forth. In many schools this adviser or committee does not come into operation until the student enters on the doctoral project, and then the adviser may well be a faculty member of the student's own choosing. A few institutions hold periodic meetings in the departments among graduate students and faculty for discussion of topics connected with special fields of interest.

There is, in short, evidence to support the view that, while the guidance of graduate students will probably never equal that of undergraduates in the better colleges, the traditional *laissez faire* concept is being somewhat modified. But Friedenberg's observation is still valid. The business of the graduate faculty member is research. Student-teacher relationships tend to be more formal and less supportive. . . . [the teachers] are most effective with those students who need less to be nurtured.¹⁵ And this is as it should be.

Residence, attendance, and grades

Before we look in detail at the curricular requirements for the doctorate, there are several subjects which deserve at least brief attention: residence requirements, class attendance, and grading systems.

The minimum time the graduate student must spend in completing the requirements for the master's degree is one year, or in some instances two years. For the doctorate it is usually three years beyond the baccalaureate. The student who completes his Ph.D. degree in the minimum period, however, is the exception rather than the rule. The average time is said to be six years, though this may not necessarily be a period of uninterrupted study. Many students take a break in their work after completing the formal course requirements and before undertaking the dissertation. Frequently this is for financial reasons or

through a desire to gain practical experience in the field before the completion of formal training. Although relatively few graduate schools have announced a maximum limit on the time allowed for completing the degree, there is a marked trend now to set a terminal date, usually eight to ten years after the inception of graduate study.²⁸ Too great an interruption in graduate study or too long a delay in submitting the dissertation may result in the invalidation of all previous credit for course work.

A few other observations on residence requirements: a substantial number of graduate schools offer courses in the evenings and in summer sessions. Although a master's degree may be obtained through such part-time study, the doctorate ordinarily requires at least some period of full-time residence in a regular term or year. It does not, however, necessarily require residence for the period when the student is preparing his dissertation. Some schools specify merely that he maintain matriculation for the degree by the payment of a minimal fee, others require the fee only for the year in which the candidate expects to receive the degree.

In the matter of class attendance there is little that can be said beyond the fact that relatively few graduate schools publish specific regulations. In general the graduate student is on his own, with the privilege of appearing for class or not, but his attendance is, if anything, more regular than that of the usual undergraduate. A number of his courses—particularly the seminars—may meet at irregular intervals, with the student devoting the intervening time to working on assigned projects, but when the class convenes he is present because it is to his best educational interests to be there.

While no standard grading system is used among graduate schools there is a tendency to draw not quite so fine a line as in undergraduate study. For example, many schools limit themselves to two, or at the most three, rating levels: failing or passing, or possibly passing with distinction. Others employ the conventional letter grade, often with the specification that a grade of less than B is not accepted for credit in the major field. Under this system it is common for a minimum grade of C to be required for work in courses taken in minor or related fields. This practice seems most common in schools where graduate and undergraduate students attend the same classes.

It is difficult to generalize on the grading systems used in graduate schools, just as it is on the sources of grades. A rather common pattern of graduate instruction is to require more papers and reports and fewer tests and examinations. Thus the final grade may represent an evaluation of two or three reports and only one—a terminal—examination. As for the minimum satisfactory grade, many of the school catalogues specify a minimum level of performance based upon the particular grading system in force. Several institutions reportedly em-

ploy no standard system, eschewing completely the use of grades and credits in connection with advanced degrees. Here as in many other schools the student may be asked to withdraw if he does not appear to be profiting from his graduate study. A study conducted in 1944 concluded that there are relatively few failures in course, and that most graduate students make grades in courses high enough to be satisfactory under the standards of the institution they are attending."

The curriculum

The student is usually required to complete a minimum of two years of formal course work leading to the Ph.D. degree, at the end of which he may be expected to take a written or oral comprehensive examination. If he completes this successfully, he then begins work upon his thesis. On submission of the completed thesis he often is required to defend his work in a second oral examination. This three or four stage procedure is subject to so many variations that each of these stages needs to be discussed separately."

A review of current catalogues shows that the course requirements for the doctorate usually consume from two to three years, with the full time student ordinarily carrying four courses per term or semester. The program of study revolves around the major field. In some graduate schools, particularly among the older schools, the student may not elect any courses outside his major department, if he does he will receive no credit for them toward his degree. In many of the newer institutions, however, he is required to elect one, or at times two minors in fields related to his major.³⁰ Usually this minor is limited to about one-quarter to one third of his total course load, though in a few schools it may reach as high as one half.

In a recent article Harold Taylor, president of Sarah Lawrence College, complained that the traditional Ph.D. program is so highly specialized that it nullifies the likelihood of the candidate's becoming flexible and imaginative about using the content of his specialized knowledge in many different ways.³¹ There are many indications, however, that the conventional one-sided approach is being modified in the social sciences and humanities, and in some instances in the natural sciences as well. Interdepartmental doctorates are springing up in a number of graduate schools and even where these do not exist formally, the student is often encouraged to elect related courses in other departments or divisions of the university. In some instances he may even be permitted to register for certain undergraduate courses though usually not for credit. The fact remains that graduate study generally continues to have as its primary aim the training of specialists, and the curriculum is designed accordingly.

While it is customary for the departments to prescribe certain courses, the student, particularly in the larger schools, may have a wide latitude of choice among the areas of specialization within the department. Though his degree, for example, is in history, he may well specialize in ancient history, medieval, modern European, English, United States, Latin American, modern Asian and African, and so forth. In some of the scientific and technological fields, the number of departmental specializations reaches almost astronomical heights.

The curricular pattern often includes a distinction between the courses the student takes in his first year of graduate study and those of the second and succeeding years. On this pattern he will usually take the required basic courses in the first year, and here he may expect to find the larger lecture sections, frequently with advanced undergraduate students present. In the second year he will begin his more highly specialized courses and laboratories, and here his program will consist largely of small, seminar type classes.

The seminar—which is probably the most characteristic graduate course—may be described as a group of highly competitive young specialists, each working on his own research problem and each concerned as much with the methods of research as with the results of a particular project. In the seminar there is not so much instruction as there is induction. A premium is placed upon ability to conduct independent investigations and to report on them effectively. An assigned textbook may be used, but the student is expected to read widely in the field and to go beyond the basic materials of the course. As in graduate work in general, what he is expected to know bears only a limited relationship to any assigned text or formal lectures by the instructor.

Examinations and candidacy

In some graduate schools the student is required at the end of his first year, to take a series of qualifying examinations, usually in a limited group of subjects chosen from the entire field of the major. If his performance is on too low a level he is advised not to continue his graduate study. In some instances he may be permitted to salvage something from his investment by completion of the requirements for the master's degree.

A substantial number of graduate schools require some form of comprehensive examination at the end of the second year, or when the student has completed his formal course requirements. These may be written or oral or both, and may include the minor as well as the major fields of study. Failure to pass them does not necessarily mean withdrawal, although the school frequently places a limit upon the number of times a student may attempt the examinations. Generally it is desirable for him to stand for his orals as early as pos-

The road to the Ph D degree is a difficult one, with some pitfalls and many hardships. Its professional compensations, as suggested in the earlier sections of this essay, are many, for most graduate students, the sacrifices are well worthwhile. There are, moreover, rich rewards along the way. In the words of that wise and genial teacher and scholar, Howard Mumford Jones, the principal compensations for the hardships of graduate life are

- 1 The sense that one's energies are focused upon an adult way of life—the problem of professional preparation

- 2 Associating on terms approaching intellectual equality with specialists in the field of the student's choice

- 3 A growing awareness of his own proficiency as a young expert in the field

- 4 A final glory of graduate work is the sense of being one with a company of learned men the world over, men who are concerned for the advancement of knowledge without reference to class, race, religion, nationality, or language¹¹

If this GUIDE TO GRADUATE STUDY succeeds in encouraging just a few young men and women, who otherwise might not have done so, to think of themselves in the light of these satisfactions, it will have more than justified the effort involved in its composition.

Notes to the text

1 For the history of graduate instruction in America see especially Isaiah Bowman, *The Graduate School in American Democracy* (Washington: US Government Printing Office, 1939), Marcia Edwards, *Studies in American Graduate Education* (New York: The Carnegie Foundation for the Advancement of Teaching, 1944), Laurence Foster, *The Functions of a Graduate School in a Democratic Society* (New York: Huxley House Publishers, 1936), Byrne J. Horton, *The Graduate School (Its Origin and Administrative Development)* (New York: The New York University Bookstore, 1940), Walton C. John, *Graduate Study in the Universities and Colleges in the United States* (Washington: US Government Printing Office, 1935). A good short historical sketch may be found in *American Universities and Colleges 1936*, ed. Mary Irwin (Washington: American Council on Education, 1936), p. 16.

2 *Op cit*, p. 59.

3 (New York: Fund for the Advancement of Education, December, 1955), pp. 3-4. See also Jacques Barzun, *Graduate Study at Columbia* (New York: Columbia University Press, 1956), E. V. Hollis, *Toward Improving Ph.D. Programs* (Washington: American Council on Education, 1945), 'Graduate Preparation of Teachers of General Education—A Controversy,' *College and University Bulletin* IX, No. 11 (March 15, 1957).

4 L. A. J. Metcalf, *Goals for American Education* (New York: Harper & Brothers, 1950), p. 287.

5 Walter Crosby Eells, 'Honorary Ph.D.s in the 20th Century,' *School and Society* 85 (March 2, 1957), 74. See also Leo L. Rockwell, 'Whence and Whither the Ph.D.?' *School and Society* 84 (September 29, 1956), 107-109.

6 *A Friendly Guide into the Graduate School* (Birmingham, Ala.: Bulletin of Birmingham Southern College, Vol. 39, No. 4, 1947), p. 14. This pamphlet is highly recommended to any prospective graduate student.

7 In the 'Foreword' to Isaiah Bowman, *op cit*, p. v. Since 1945 the number of graduate schools providing programs leading to the Ph.D. has increased from 96 to the present 135.

8 Foster, *op cit*, p. 1.

9 Howard Mumford Jones, *Education and World Tragedy* (Cambridge: Harvard University Press), pp. 136-137.

10 *Op cit*, p. 7.

11 See also Lloyd E. Blauch, *Education for the Professions* (Washington: US Government Printing Office, 1955).

12 Bowman, *op cit*, p. 13.

13 W. W. Brickman, editorial comment, *School and Society* 84 (September 29, 1956), 111.

14 *Graduate Education for Women: The Radcliffe Ph.D.* (Cambridge: Harvard University Press, 1956). This book is highly recommended to any undergraduate woman contemplating graduate study.

15 Rex C. Kidd, 'Improving Preservice Education of Undergraduate College Teachers,' *The Journal of Teacher Education* III (March, 1952), 55. Cf. Leo L. Rockwell, 'Whence and Whither the Ph.D.?' *School and Society* 84 (September 29, 1956), 107-109.

16 Two useful presentations of this problem have been prepared under the auspices of The Fund for the Advancement of Education: *Teachers for Tomorrow* (Bulletin No. 2, November, 1955) and *Better Utilization of College Teaching Resources* (October, 1956).

- 17 *Teachers for Tomorrow*, *op cit*, p 19
- 18 J F Wellemeyer, Jr 'Full Time Teachers in American Colleges and Universities' *School and Society* 83 (June 23, 1956), 220-221
- 19 *New York Times* (May 26, 1957), I, 58
- 20 *Better Utilization of College Teaching Resources* *op cit* p 4 Cf *Statistics of Higher Education Faculty Students, and Degrees 1953-4* (Biennial Survey, US Office of Education)
- 21 *Instructional Staff Practices and Policies in Degree Granting Institutions, 1953-4* (Washington National Education Association, Bulletin XXXII No 4, December, 1954), p 166 Cf Lloyd S Woodburne, *Faculty Personnel Policies in Higher Education* (New York Harper & Brothers, 1950), p 10
- 22 *Teacher Supply and Demand in Degree Granting Institutions 1954-5* (Washington National Education Association Bulletin XXXIII, No 4, December 1955), p 130
- 23 *Ibid*, p 158
- 24 Conducted under a research grant from the US Office of Education The survey at present includes college and university teachers in the State of Minnesota only
- 25 Letter to the editor of the *Guide to Graduate Study* dated May 1, 1957 The American Council on Education is currently sponsoring the preparation of a pamphlet on college teaching as a career under the authorship of Fred M Hechinger Other interesting books and articles on the subject are listed in the bibliography
- 26 *New York Times* (May 26, 1957), I, 38
- 27 The total grant to colleges medical schools and hospitals was \$400 000 000
- 28 *Salaries Paid and Salary Practices in Universities, Colleges and Junior Colleges, 1955-6* (Washington National Education Association, October, 1956)
- 29 See Theodore C Blegen and Russel M Cooper, eds, *The Preparation of College Teachers* (Washington American Council on Education, July, 1950), p 62
- 30 *Op cit*, p 55
- 31 And Those Who Can—Teach *Teachers College Record* 58 (May, 1957), 439
- 32 *Op cit* p 33
- 33 *Higher Education and National Affairs* (Vol. VI, No 6 February 21, 1957)
- 34 Blegen and Cooper list courses in higher education conducted by leading American Universities (*op cit* see table on p 108), but it is doubtful how many of these are actually required of the graduate student Of interest in this respect is the quarterly published by the graduate school of Oregon State College entitled *Improving College and University Teaching*
- 35 Gerald Eades Bentley, 'The Graduate School as Preparation for Teachers,' *College English* XII (Oct., 1950 May, 1951), 330-335
- 36 Throughout this discussion the college teacher is referred to in the masculine While it is a fact that approximately four out of five college teachers are men, a concerted effort is under way to encourage more women to enter the profession At present the highest percentage of women teachers is found in teachers colleges (36.8 per cent), with the next highest (33.5 per cent) in nonpublic colleges and the smallest (13.7 per cent) in nonpublic universities For the division by fields see *Teacher Supply and Demand in Degree Granting Institutions 1954-5*, *op cit*, p 133
- 37 "College Teaching as a Spiritual Adventure, one of the James Henry Morgan Lectures on College Teaching delivered at Dickinson College November 29 1955
- 38 *Op cit*, p 1
- 39 Held at the University of Pennsylvania October 28-30 1948
- 40 Cf Blegen, *op cit* pp 90-91
- 41 See p 105
- 42 Quoted by John, *op cit* p 39
- 43 The writer knows of one instance of a brilliant master's essay containing many quotations but without a single identification or reference Fortunately a team of fellow graduate

students lent a hand and, after approximately two weeks managed to supply the necessary footnotes

44 I am deeply indebted in this discussion to my colleague Dr Herbert Wing, Jr. of Dickinson College, who not only taught me how to handle the card system in that dim past when I was a college freshman but whose continued interest in research led him to provide the sketch from which these paragraphs have been drawn

45 US Office of Education, *Statistics of Higher Education Receipts, Expenditures, and Property, 1951-2* (Washington US Government Printing Office, 1955)

46 See pp 39-44

47 Edward Lee Thorndike, 'Earned Opportunities, *Journal of Adult Education* 7 (June, 1935), 260

48 *Op cit*, p 83

49 Edgar A. Friedenberg and Julius A. Roth, *Self Perception in the University* (Chicago The University of Chicago Press, 1954)

50 Lee J. Cronbach, 'Personality and Intellectual Functioning in Graduate Students,' in *Growing Points in Educational Research* (Official Report of the American Educational Research Association, 1949) See also Stuart Conrad Peterson, *The Measurement and Prediction of Scholastic Achievement on the Graduate Level* (University of Iowa, Doctoral Dissertation, 1943)

51 *Graduate Education for Women op cit*, p 76

52 Reported by E. V. Hollis *op cit*, p 164

53 Nevertheless the Association of American Medical Colleges sponsors the yearly publication of a manual on admissions requirements to medical schools

54 Bruce V. Moore, 'Educational Facilities and Financial Assistance for Graduate Students in Psychology 1956-7,' *The American Psychologist* XI (January, 1956), 25

55 *Report of the Committee on Graduate Instruction, American Council on Education* (Washington, 1934) It is interesting to observe that not more than forty five per cent of the departments in any subject field were rated as distinguished by the selected group of scholars whose opinions were solicited

56 Ann Arbor, Michigan See also *Doctoral Dissertations Accepted by American Universities*, compiled for the Association of Research Libraries (New York H. W. Wilson, 1934-55), Nos 1-22

57 The newer graduate schools tend to accept combined graduate and undergraduate enrollments as necessary or at least inevitable. The older schools, particularly in the East, generally exclude undergraduates from all graduate courses. Where a school has combined classes the usual pattern includes three types of courses: 1. Those for advanced undergraduates, along with graduate students, 2. those primarily for graduate students but open to a few highly selected undergraduates, and 3. those exclusively for graduate students—usually seminar courses or courses related to the preparation of the thesis. While there is no standardization here it may be generally expected that where combined classes are offered, such courses comprise from one third to one half of the graduate student's course work.

58 Hollis concluded that, as of 1940 "recruitment for most graduate schools is a state or regional undertaking." Statistics show that in that year only ten institutions belonging to the Association of American Universities recruited fifty per cent or more of their graduate students from out of the state. *Op cit*, p 200

59 The writer knows of no statistical data that show the percentage of students accepted out of the total number of applicants

60 See Edwards, *op cit* p 24

61 John, *op cit*, p 99

62 A number of graduate schools admit undergraduates from the same institution into graduate courses. In general, however, these are not matriculants for advanced degrees

63 Edwards *op cit* p 23 This study also cast doubt on the popular assumption that private universities were more selective than public in their graduate admission programs

64 The reader may be interested in looking at the following studies compiled by the Office of Scientific Personnel under the direction of M H Trytten *The Baccalaureate Origins of the Science Doctorates Awarded in the United States from 1936 to 1950 Inclusive* (Washington, National Academy of Sciences—National Research Council, 1955 Bulletin 382) and *Baccalaureate Origins of Doctorates in the Arts Humanities and Social Sciences Awarded in the United States 1936-1950* (Washington, National Academy of Sciences—National Research Council, 1956 Bulletin 460) Cf Robert H Knapp and Joseph J Greenbaum, *The Younger American Scholar His Collegiate Origins* (Chicago University of Chicago Press 1953)

65 *Graduate Study for Women op cit* p 81

66 In the case of the MAT the fee is paid directly to the center administering the test whereas the fee for the GRE tests must accompany the application

67 The material for this discussion was supplied by Dr Gerald V Lannholm of the Educational Testing Service

68 It is worth noting that these examinations are used by the graduate schools for other purposes as well. For example, the Area Tests of the GRE are at times employed to determine candidacy for the Ph.D. Similarly these and other tests are frequently utilized for purposes of evaluation and guidance and of establishing admission standards. See Philip R. Harvey *The Use of the Graduate Record Examinations by Colleges and Universities* (Princeton Educational Testing Service 1957) p 21

69 *Ibid* p 29

70 Bruce V Moore *op cit* p 25

71 One graduate student, probably speaking from experience strongly advised straightening out all such difficulties in advance. They become considerably more complicated, he said, after admission.

72 At some graduate schools these tests are given later in the first semester

73 In the Introduction to Edwards, *op cit* p xii

74 *Op cit* p 14

75 *Op cit* p 3

76 In a recent address Dean Jacques Barzun of Columbia University spoke sharply against the amount of time commonly needed for obtaining graduate degrees. "The nation won't wait for us," he said, "and unless we reform our habits we may be by passed." *New York Times* (May 15 1957) p 36

77 Edwards *op cit* pp 6-8

78 By its very nature graduate study resists standardization in quantitative requirements. Nevertheless a committee of the American Association of University Professors in 1918 laid down a detailed set of ground rules which are observed even at the present time. See *Bulletin of the AAUP V* (January-February 1919) 12-18

79 In a few graduate schools a third minor may be substituted for one of the required foreign languages

80 Graduate Preparation of Teachers of General Education—A Controversy" *College and University Bulletin* Vol. 9 No. 11 (March 15 1957) 4

81 Only four of the institutions included in this manual indicate in their bulletins that the oral defense of the thesis is open to the university public

82 *Op cit* pp 97-98 For a fuller discussion of methods of research see pp 14-18

83 *Op cit* p 5

84 *Op cit* p 47

85 In 1939-40 sixty-eight graduate schools had some requirement relating to publication, twenty-five of these requiring only an abstract. See Association of Research Libraries *Doc*

toral Dissertations, op cit, Table I

86 University Microfilms, Ann Arbor, Michigan

87 For an enlarged discussion of the research process see p 14 of this manual.

88 *A Friendly Guide, op cit, p 22*

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GRADUATE SCHOOLS

offering programs leading to the Ph.D.

The information for this section of A GUIDE TO GRADUATE STUDY was obtained from questionnaires filled out by officials designated by the president of the participating colleges and universities. No secondary sources were utilized. Because of the great variety in the nature of the institutions and their programs, the following explanatory comments are offered to assist in interpreting the data.

Where several administrative units within the institution provide programs leading to the Ph.D., these are treated *seriatim*, with the arts and science division usually listed first.

Because of the impracticability of listing all the special educational facilities provided at each institution, an attempt has been made to include only those which appear to be distinctive or to give an impression of the scope of such facilities.

Although many institutions offer both summer and evening courses, ordinarily the number of courses available at these times is less than during the day and in the regular academic year.

Admission Requirements in some instances the admission requirements shown here are those for admission to *candidacy* for the Ph.D. degree rather than admission to graduate study. This distinction is usually self-evident.

Tests and Averages the abbreviation CAVD is used to indicate the Thorndike test of general ability (Completion, Arithmetic, Vocabulary, and Direction), GRE, the Graduate Record Examinations, MAT, the Miller Analogies Test, GPA, Grade Point Average.

Fees where no differentiation is indicated between in-city and out-of-city or in-state and out-of-state, it may be assumed that the fees are the same for all graduate students. In general, only tuition fees and charges for room and board are listed. Ordinarily the graduate schools assess many minor charges, as well.

Financial Assistance the forms of assistance described under this heading are reportedly available to new, or first-year, students.

Fields of Study for the Ph.D. a, In general, where several areas of concentration are available within the field, these are specified. In a few instances, however, the listing includes all phases of the field rather than merely those areas in which the student might expect to concentrate. b, The prerequisites specified under fields of study are usually those which the student must satisfy for admission to graduate school, but he should also

refer to the information under "Admission Requirements" (see item 4 above). In many schools, however, he has an opportunity to make up deficiencies after admission. c, Unless otherwise specified, the administrative unit may be assumed to be the department, as identified by the field of study d, Combined programs are those which provide for the student's working under the aegis of two or more departments or divisions. Enrollments and faculty numbers, unless otherwise indicated, are for the academic year 1956-7.

Faculty and Enrollment because of the possibility of variations in the method of arriving at the figures, these data are to be used merely as indicative of the size and scope of the programs

At the end of some of the individual entries, under the heading of "Notes," are listed courses or programs specifically designed to assist the graduate student in becoming an effective college teacher

Adelphi College

GARDEN CITY NEW YORK

Division of Graduate Studies

The doctoral program in psychology (clinical, school and experimental) was established in 1949 the first Ph.D. conferred in 1952. Other graduate programs lead to master's degrees with specialization in advanced psychiatric nursing, education, social work, sociology, speech and hearing correction, applied mathematics, applied physics and chemistry. Ph.D. programs in clinical and school psychology are coordinated with related professional programs through a core curriculum and coordinated field work.

Child guidance clinic owned and operated by the College and facilities for supervised practice in nearby state county and private hospitals, in community agencies and public schools.

A limited number of men and women are admitted each year. 7 Ph.D.'s awarded in 1956-7.

Two to three years residence required for the doctorate.

ADMISSION REQUIREMENTS

Graduation from accredited institution with evidence of qualifications for advanced study as shown by a high scholastic record, personal qualities and promise of professional development.

Ph.D. candidates must demonstrate: 1. an adequate reading knowledge of two modern foreign languages; 2. a more thorough reading knowledge of one modern foreign language; or 3. the successful completion of a course of study in general language with special emphasis on the Greek and Latin origin of terms.

GRE required including Aptitude Test and Advanced Test in Psychology.

Recommended background in biological and social sciences as well as in mathematics and literature.

Apply between December 15 and April 15 to Office of the Graduate Division.

FEES AND FIRST YEAR AID

Tuition—\$800

Assistantships available from \$700 to \$1,500. Apply between December 15 and April 15 to Office of the Graduate Division.

FIELDS OF STUDY FOR THE PH.D.

Psychology Clinical school, experimental. Prerequisites: general, developmental, abnormal, experimental (with lab experience) psychology, and descriptive statistics, also a course in tests and measurements for admission to the program in clinical or school psychology. Faculty: 12 full time, 4 part time. 36 graduate students enrolled.

The University of Akron

AKRON 4 OHIO

The Graduate Division

The master's degree (in course) was first granted by Buchtel College in 1880. The reorganization of the College into The University of Akron took place in 1913. In 1956 the University first offered programs leading to the Ph.D. for original work in chemistry, with the area of investigation limited to the various aspects of polymer chemistry.

The Institute of Rubber Research, which has conducted contract research in pure science on campus since 1943, makes available to qualified students its facilities and personnel. These students may be employed up to full time in such research and can often use their work as the basis for a thesis or dissertation. They also may pursue the accompanying graduate courses in their free time. The library of the Division of Rubber Research, American Chemical Society, is located on campus. The research centers and home plants of the leading rubber manufacturers are near.

Summer courses

Residence requirement for doctorate: at least 24 credits of the necessary 48 credits of graduate course work, a minimum of one calendar year of full time research.

ADMISSION REQUIREMENTS

Bachelor's degree from a regionally accredited institution and proof of background for graduate work. Undergraduate quality point ratio of at least 2.50 in all work taken and 2.75 in chemistry (C is 2, B is 3).

Demonstration of ability to use at least two modern foreign languages—approved by the head of the Chemistry Department.

For degree, comprehensive examination covering all course work, final examination on the dissertation.

Apply to Registrar, with complete official transcripts at least one week before published registration period

FEES AND FIRST YEAR AID

Tuition—in City of Akron \$20 per credit, out of city \$25 per credit No university housing

Three \$1,500 fellowships awarded annually and several research assistantships, \$3,300 to \$3,600 per year Apply to head of Chemistry Department before April 15

FIELDS OF STUDY FOR THE PH D

Chemistry Polymer chemistry Applicant may be required to prove satisfactory background by test A minimum of 48 graduate course credits of excellent quality, plus admission requirements given above Faculty 9 full time, 6 part time 12 degree candidates enrolled

Alabama Polytechnic Institute

AUBURN ALABAMA

The Graduate School

The East Alabama Male College, predecessor of the Alabama Polytechnic Institute, awarded its first Master of Arts degree in 1870 The doctoral program was not inaugurated until the Fall of 1932 The Dean administers the school in conjunction with a Graduate Council composed of members of the Graduate Faculty appointed by the President on recommendation of the Dean.

Complete laboratory equipment for nutrition studies including equipment to conduct labeled element studies, facilities for radio isotope studies, agricultural experiment station, engineering experiment station, animal disease laboratory, cooperative wildlife research unit, fisheries laboratory, nematology laboratory, seed physiology laboratory, weed control laboratory

Campus is 39 miles east of Montgomery, Alabama, and 116 miles southwest of Atlanta,

Georgia and an equal distance southeast of Birmingham, Alabama Accommodations on campus throughout the year for graduate students

Men and women Summer courses available in all areas, evening courses only in education for Ed D degree 2 Ph.D s and 7 Ed D s during 1956 7

Residence requirement for doctorate three years at least three quarters of which must be spent consecutively on campus

ADMISSION REQUIREMENTS

Bachelor's degree from accredited institution. Departments set various prerequisite requirements Apply to Dean of Graduate School at least three weeks prior to announced date of registration for the quarter in which the student proposes to begin graduate studies

FEES AND FIRST YEAR AID

Tuition—\$10 for first hour, \$5 for every hour thereafter, with a maximum of \$50 Room and board in college operated dormitories—\$150 00 per quarter

Teaching fellowships, graduate assistantships, research fellowships, and research assistantships are available in many departments, stipends vary from \$1170 to \$2400

FIELDS OF STUDY FOR THE PH D

Animal Husbandry and Nutrition Prerequisites a bachelor's degree including fundamental science courses Faculty 10 full time 8 graduate students enrolled

Botany and Plant Pathology Botany and plant pathology with emphasis in plant nematology Prerequisites bachelor's degree with training in botany, chemistry mathematics, physics and zoology Faculty 10 full time 7 graduate students enrolled

Chemistry Physical, organic, and inorganic. Prerequisites general, analytical, organic, and physical chemistry, college physics, mathematics through calculus Faculty 17 full time 16 graduate students enrolled

Entomology Prerequisites bachelor's degree and satisfactory training in chemistry physics biology, and mathematics Faculty 25 full time in Department of Zoology Entomology 11 graduate students enrolled.

Fisheries Management Prerequisites bache-

for s degree and satisfactory training in chemistry, physics, biology, and mathematics Faculty 25 full time in Department of Zoology Entomology 6 graduate students enrolled

Game Management Prerequisites bachelor s degree and satisfactory training in chemistry, physics, biology, and mathematics Faculty 25 full time in Department of Zoology Entomology 2 graduate students enrolled

Mathematics Prerequisites bachelor s degree and thirty quarter hours of mathematics beyond the freshman level Faculty 31 full time 25 graduate students enrolled

Poultry Husbandry Prerequisites bachelor s degree including fundamental science courses Pb D degree offered in cooperation with animal husbandry and nutrition or zoology entomology Faculty 8 full time 9 graduate students enrolled.

Zoology Prerequisites bachelor s degree and satisfactory training in chemistry, physics, biology, and mathematics Faculty 25 full time in Department of Zoology Entomology 9 graduate students enrolled

University of Alabama

UNIVERSITY ALABAMA

Graduate School

Although graduate instruction has been offered since the 'eighties the Graduate School was not established until 1924 All graduate work is under the control of the Graduate School

There is a residence hall for graduate men and one for graduate women Libraries of the State Geological Survey and the Experimental Station of the US Bureau of Mines, natural history museum speech and hearing clinic, psychological services clinic, bureaus of business and educational research and of public administration

Men and women Summer and evening courses 11 Ph D's awarded in 1956 7

Residence requirement for the doctorate a minimum of 3 full academic years of graduate study, at least one year in residence at the University, prior to the dissertation year, following graduate study elsewhere

ADMISSION REQUIREMENTS

Undergraduate degree with high scholastic record, 3 letters of recommendation from appropriate persons Selection is based on scope and quality of applicant s preparation

GRE, or standard admission tests, required in Medical College and the School of Dentistry Chemistry and Physics Departments give general orientation tests Department of Political Science also recommends GRE

Apply to office of Graduate Dean at least six weeks in advance of registration date

FEES AND FIRST YEAR AID

Tuition—in state \$180 per academic year, out of state \$530 Room—men \$45 to \$108 per semester, women \$65 to \$108 Board—women \$185 per semester Meals not served in men s residence halls

Twenty University scholarships, with \$750 stipend and remission of non resident tuition, no service required Assistantship stipends depend upon amount of service performed Apply to office of Graduate Dean prior to March 1 for the succeeding year

FIELDS OF STUDY FOR THE PH D

Anatomy Prerequisites major in the biological sciences, French and German, either GRE or Medical College Admission Test Program administered by the Graduate School Faculty 11 full time, plus members of other departments 3 graduate students enrolled

Biochemistry Prerequisites preparation in general, analytical, physical, and organic chemistry, basic courses in physics and general biology, French and German, either the GRE or the Medical College Admission Test Program administered by the Graduate School Faculty 5 full time, plus members of other departments 13 graduate students enrolled

Biology Botany and zoology, animal ecology, cytology, entomology parasitology, protozoology, vertebrate taxonomy, plant ecology, plant morphology, and plant physiology Prerequisites substantial knowledge of at least two of these subjects chemistry, geology, mathematics, physics, 12 semester hours each of basic courses in botany and in zoology, completed with high scholarship, 2 foreign languages appropriate to student s interest—usually French and German, guidance conference between each student and

the faculty Faculty 7 full time, 1 part time 17 graduate students enrolled

Chemistry Analytical, inorganic, organic, and physical chemistry Prerequisites fundamental courses of college grade in general, organic, analytical and physical chemistry, physics, mathematics through calculus, French and German, general orientation examination before or soon after registration (largely for guidance purposes) Faculty 17 full time 4 part time 27 graduate students enrolled

Commerce and Business Administration Accounting economics finance, management, and marketing Prerequisites bachelor's degree from a school of commerce or business administration which is a member of the American Association of Collegiate Schools of Business, or a degree, plus prescribed courses amounting to 27 semester hours, 2 foreign languages, or one and statistics Faculty 36 full time 111 graduate students enrolled

Education Elementary and secondary education school administration Prerequisites undergraduate major in education, and two academic minors, several years of professional service preferred 2 foreign languages or one foreign language and either statistics or some appropriate field of learning outside of approved major and minor fields, series of counseling tests before or immediately after admission (for guidance purposes) Ed D also awarded in this field Faculty 32 full time 273 graduate students enrolled.

English Old and Middle English, Renaissance literature modern English literature, American literature Prerequisites undergraduate major in English with excellent scholastic record, French and German (although another foreign language appropriate to the student's research interest may be substituted for either of these languages) Faculty 19 full time 26 graduate students enrolled.

History American the South, Modern European, Latin American Prerequisites basic courses in American and European history with attention to broad study in the social sciences, 2 foreign languages appropriate to the student's research interests, or one foreign language and either statistics or some appropriate field of learning outside of approved major and minor fields Faculty 14 full time 32 graduate students enrolled

Pharmacology Prerequisites adequate comprehension of physiology, organic chemistry, and microbiology, French and German, GRE or Medical College Admission Test Faculty 4 full time, plus members of other departments 3 graduate students enrolled

Physics Microwaves, nuclear magnetic resonance atomic and nuclear physics, radio astronomy, infrared spectroscopy, theoretical physics Prerequisites equivalent of undergraduate major in physics and undergraduate minor in mathematics, at least one intermediate course in each of the main fields of physics, comprehensive background in general physics, standard entrance test in physics Faculty 7 full time 16 graduate students enrolled

Physiology Prerequisites biology and physics, general, analytical, physical, and organic chemistry, knowledge of comparative anatomy and histology desirable, French and German, GRE or the Medical College Admission Test Faculty 5 full time, plus members of other departments 2 graduate students enrolled

Political Science American government, governments of foreign countries international relations public administration, political theory Prerequisites undergraduate major in political science, work in other social sciences and elementary statistical methods 2 foreign languages appropriate to student's research interests, or statistics as substitute for one foreign language Recommended GRE Faculty 11 full time 19 graduate students enrolled

NOTES

Departmental seminars in teaching methods and aids, philosophy of education, and institutional organization Supervised teaching

The American University

WASHINGTON, D C

The Graduate School

Instruction has been offered since 1914 in the Graduate School of the University, which was chartered by Congress in 1893

Ed D offered by Department of Education. Intensive institutes held in cooperation with

government agencies and other organizations in real estate appraisal, C.P.A. examination review, recent advances in chemistry and physics, genealogical research, position of the United States in world affairs preservation and administration of archives, records management, human relations and intergroup understanding, and current problems in education Interdepartmental area programs are offered in Russian and East European, and in Latin American studies Human relations area files, American Peace Society library

Men and women Affiliated with the Methodist Church. Summer and evening courses 28 Ph.D.s awarded in 1956-7

Residence requirement for the doctorate thirty hours of credit must be taken in residence at the University

ADMISSION REQUIREMENTS

Bachelor's degree earned in a four year curriculum or equivalent Undergraduate record must indicate ability to pursue graduate work.

GRE recommended in individual cases

Full time students should apply three weeks before the opening of the semester to Admissions Office, 1901 F Street NW, Washington 6, D.C.

FEES AND FIRST YEAR AID

Tuition—\$18 per credit hour Housing not ordinarily provided for graduate students

Graduate awards ranging from \$300 to \$2,000 some of which carry half or full tuition Apply before March 15 to Office of the Graduate Dean Loan funds are available to full time students

FIELDS OF STUDY FOR THE PH.D.

Business Administration Business management, economics and administration, industrial management, marketing, finance, accounting, advertising, foreign trade real estate, transportation, retailing Prerequisites 6 hours each of accounting economics statistics, and business administration Faculty 10 full time, 78 part time 253 graduate students enrolled

Economics and Economic History Economics history of economic thought, contemporary economic theory, money and banking, labor economics public finance international trade, international economics economic geography Prerequisites 24 hours in the social sciences, of which at least 15 must be in economics Economic History

history of economic thought, contemporary economic theory, specialized fields of economic history, specialized fields of economics Prerequisites 30 hours in the social sciences, including a minimum of 12 in economics and 12 in history Faculty 5 full time, 31 part time 122 graduate students enrolled

Government and Public Administration Government governments in the United States, special aspects of government in the United States, political institutions political theory, comparative government, comparative administration, public administration in the United States Prerequisites 15 hours in political science, 9 in related fields Public Administration national, state, and municipal government, federal budgetary administration, organization and management, public personnel administration, public relations in administration, archives administration Prerequisites 6 hours in political science, 18 in related fields of administration. Faculty 11 full time, 56 part time 189 graduate students enrolled

History General history of Europe, United States the Far East, Latin America and others Prerequisites 30 hours in the social sciences, of which at least 15 must be in history and must include surveys of American and modern European history Faculty 7 full time, 11 part time 80 graduate students enrolled

International Relations International organization, international law, American diplomacy, international administration, inter American system, international relations of a specified area, United Nations Prerequisites introduction to world politics, or equivalent, 27 hours in the social sciences including 12 hours in history, 6 in government and 6 in economics Faculty 5 full time, 8 part time 106 graduate students enrolled

Mathematics Modern algebra, matrix theory, functions of real and complex variables, number theory, analysis Prerequisites 24 hours in mathematics, 6 to 8 in general physics Faculty 4 full time 27 part time 152 graduate students enrolled

Psychology General, social, personnel, developmental, and counseling psychology, personality, measurement techniques. Prerequisites 6 hours of general and 6 of experimental psychology, 3 of fundamentals of statistics Faculty 4 full time, 17 part time 140 graduate students enrolled

Sociology and Anthropology Sociological theory, methods of social research, anthropology, population studies, social organization Prerequisites 24 hours in sociology, social psychology, and anthropology, with at least 12 hours in sociology Faculty 4 full time, 12 part time. 36 graduate students enrolled

Statistics Advanced statistical theory applied statistics Prerequisites 36 hours, including mathematics through integral calculus (12 hours), statistical theory (12 hours) Faculty 4 full time 27 part time 152 graduate students enrolled

University of Arizona

TUCSON ARIZONA

The Graduate College

Established 1926 First post graduate students in 1898 9 session

Agricultural Experiment Station, State Bureau of Mines, State Museum, observatory, engineering experimental station tree ring research and carbon age determination laboratories, business research and ethnic research bureaus water utilization and atmospheric physics institutes

Men and women Summer and evening courses 5 Ph D's awarded in 1956-7

Residence requirements for doctorate total of not less than six semesters of essentially full time graduate study, of which not less than two semesters must be spent in actual residence

ADMISSION REQUIREMENTS

Bachelor's degree. Additional undergraduate courses may be required French and German or an approved substitute for one of these GRE (education only) Recommended GRE Apply to Graduate College any time prior to registration

FEES AND FIRST YEAR AID

Tuition—In state approx. \$60 per semester, out-of-state approx. \$285 per semester Room men \$88 \$116 semester, women \$92 \$100 semester Board \$50-\$55 a month.

Fellowships and assistantships, graduate scholarships of \$450 per year, covering tuition

fee for non resident students Apply before April 1 to department heads for assistantships, to Graduate Dean for scholarships and fellowships

FIELDS OF STUDY FOR THE PH D

Agricultural Chemistry and Soils Soil fertility physics microbiology, conservation, survey Prerequisites preparation in chemistry, physics, mathematics, bacteriology, botany, and other plant sciences Faculty 4 full time, 1 part time 1 graduate student enrolled

Agronomy Crop physiology, crop production Prerequisites B.S. in agriculture, including 16 semester hours or more in agronomy or allied field Faculty 5 full time, 3 graduate students enrolled

Anthropology Archaeology, cultural anthropology, linguistics physical anthropology Prerequisites 6 semester hours each of general anthropology, cultural anthropology, archaeology, physical anthropology and linguistics, candidates required to pass a comprehensive examination in the four fields Faculty 8 full time, 2 part time 16 graduate students enrolled

Biochemistry Biochemistry nutrition Minor may be in bacteriology, botany, physiology pharmacology or various branches of chemistry Prerequisites bachelor's degree in biological science, chemistry, agriculture or home economics, including not less than six credits of organic chemistry four credits of biochemistry or nutrition, and four credits in bacteriology or physiology Faculty 7 full time 5 graduate students enrolled

Botany Anatomy cytology, ecology, genetics, morphology, plant physiology and biochemistry, taxonomy Prerequisites preparation in general botany including fundamental aspects of morphology physiology and taxonomy Faculty 6 full time

Chemistry Organic, analytical, inorganic, physical chemistry Prerequisites bachelor's degree with major in chemistry, including general, analytical, organic, and physical chemistry, physics, and mathematics through calculus Faculty 11 full time, 1 part time 4 graduate students enrolled

Education Elementary and secondary education, counseling and guidance special education, the curriculum, administration and supervision, measurement. Prerequisites bachelor's degree with at least 3 credits in psychology and 12 cred-

its in education, GRE and MAT D Ed also awarded in this field of study Faculty 13 full time, 1 part time 9 graduate students enrolled.

Electrical Engineering Electronics Prerequisites bachelor's degree in electrical engineering by ECPD accredited institution or the equivalent, including courses in mathematics, physics, and engineering science Faculty 9 full time, 8 part time 8 graduate students enrolled

Entomology Insect anatomy, ecology physiology taxonomy, toxicology Prerequisites biological and physical sciences Faculty 6 full time

Geology Stratigraphic geology, economic geology, structural geology, paleontology, petrography, mineralogy Prerequisites bachelor's degree with 32 units in geology, 21 in upper division courses, general chemistry, 8 units, other chemistry, 7 units, engineering drawing, 3 units, surveying, 6 units, college algebra, 3 units, plane geometry, 2 units, descriptive geometry, 3 units, analytic geometry, 4 units, general physics, 8 units Faculty 12 full time, 2 part time 15 graduate students enrolled

Horticulture Plant physiology and genetics with particular reference to fruit and vegetable crops Prerequisites basic knowledge of botany, plant physiology, chemistry, physics, genetics, bacteriology, soil science and mathematics, including statistics Faculty 4 full time.

Meteorology and Climatology Physical meteorology and hydrometeorology, synoptic climatology, desert climatology, modern computer methods in climatology Prerequisites courses equivalent to bachelor's degree work in any of the following fields climatology, meteorology, physics, or mathematics, general placement examination (4 hours) in meteorology, climatology, mathematics and physics Recommended broad background in physics and mathematics Faculty 4 full time, 2 part time

Philosophy and Psychology Prerequisites equivalent of the University's requirement for an undergraduate major in psychology, French and German, GRE Recommended courses for individual students will be recommended after a conference between department and student. Faculty 9 full time 2 graduate students enrolled

Plant Pathology Diseases of agricultural crops and ornamentals forest pathology, mycology Prerequisites undergraduate major in

plant pathology, botany, horticulture, agronomy or plant breeding Faculty 3 full time 2 graduate students enrolled.

Range Management Physiology and ecology of range plants Prerequisites bachelor's degree in agriculture or wildlife management with 16 semester hours or more in range management, wildlife management, animal science, or related fields. Faculty 2 full time. 4 graduate students enrolled

Wildlife Management Physiology and ecology of plants of forested areas. Prerequisites preparation in zoology and botany, normally with an undergraduate major in zoology Specialization in the animal forms of wildlife is conducted in conjunction with Department of Zoology Faculty 2 full time

NOTES

Doctoral programs in Agricultural Chemistry and Soils, Agronomy, Botany, Entomology*, Horticulture, Plant Pathology, Range Management, and Wildlife Management are under the direction of the Plant Science Graduate Committee and the University Committee on Graduate Study *Entomology may be in cooperation with Department of Zoology, under direction of University Committee on Graduate Study

University of Arkansas

FAYETTEVILLE, ARKANSAS

Graduate School

The Graduate School was established in 1927 Prior to that date graduate work was under the supervision of a graduate committee Doctoral programs leading to Ph.D and Ed D were inaugurated in 1950 Work in all graduate divisions is under the administration of the Graduate School

Specialized Arkansas collection, fine arts center, linear positive ion accelerator, nuclear science laboratories, high vacuum and ion ballistic laboratory, magnetic mass spectrometer, electron microscope Affiliations with Oak Ridge Institute of Nuclear Studies

Summer courses 8 Ph.D s awarded in 1956-7 Residence requirement for the doctorate min

imum of three academic years beyond the baccalaureate degree, one year of the last two must be completed on the Fayetteville campus

ADMISSION REQUIREMENTS

Undergraduate degree Evaluation made in each individual case by the Graduate Deans of the faculty and the Department concerned GRE and other advisory examinations required in certain special cases

Apply to Director of Admissions Registrar's office

FEES AND FIRST YEAR AID

Tuition—in state \$75 per semester, out of state \$175 Rooms for men and women—\$15 to \$30 Board—approximately \$35 per month

Graduate and research assistantships available Apply to Dean, Graduate School

FIELDS OF STUDY FOR THE PH D

Biochemistry Biosynthesis of amino acids, nucleic acid and purine biosynthesis and metabolism, vitamins, bioflavonoids Prerequisites general chemistry, quantitative analysis organic chemistry, college physics, college biology or zoology—the former to include at least 12 semester hours of chemistry and/or zoology in upper level (junior senior) courses in college Also if under graduate preparation does not include physical chemistry this will be required as a graduate course. Recommended college mathematics through calculus Faculty 4 full time 7 graduate students enrolled.

Chemistry Radiochemistry chemical kinetics synthetic organic, physical organic geochemistry, spectroscopy instrumental methods of analysis instrumentation heterogeneous catalysis, tracer techniques in biochemistry, isotope effects in chemical reactions nuclear chemistry mechanisms of inorganic reactions Prerequisites one year each of general, analytical physical, and organic chemistry, two advanced lecture courses and one advanced laboratory course in chemistry, elementary physics, differential and integral calculus, advisory examinations on entrance Recommended master's degree Faculty 16 full time, 2 part time 43 graduate students enrolled

Economics Economic theory accounting, finance government and business, marketing, management. Prerequisites completion of requirements for M.B.A. or M.A. (economics).

French or German (or Spanish in some cases), written field examinations and final oral usually over dissertation, proficiency in use of two research tools (i.e., accounting statistics, calculus) or in special cases a second language Recommended master's degree. Faculty 39 full time, 4 part time 34 graduate students enrolled.

English Linguistics medieval, Renaissance, 18th century, 19th century, modern, and American Prerequisites for Ph.D. M.A., written examinations in five fields of concentration, general oral, oral on thesis, doctor's thesis, at least two courses in any field in which the candidate does not take written examinations, at least two courses in comparative literature Faculty 8 full time

Pharmacology Testing of hypotensive and cardiac drugs Prerequisites general college chemistry, organic chemistry, college physics, biochemistry, and college zoology Faculty 4 full time 3 graduate students enrolled

Baylor University

WACO, TEXAS

The Graduate School

Established in 1845 Baylor University is owned and operated by the Baptist General Convention of Texas The first graduate degree was offered in 1894 At present there are fifteen departments and schools on both the master's and doctor's levels

A medical school in Houston and a college of dentistry in Dallas offer the M.D. and D.D.S. Ed.D. is offered on the Waco campus Brooke Army Hospital and the U.S. Army Medical Service School at San Antonio offer graduate work as affiliated units

3 Ph.D.s awarded in 1956-7

Residence requirement for the Ph.D. minimum of one academic year on campus

Graduate students may live in dormitories or elsewhere

ADMISSION REQUIREMENTS

Transcripts evaluated by Dean and department chairman, who may require special tests High scholastic average and adequate background in chosen field.

A reading knowledge of two foreign languages is required for the Ph D, and an additional foreign language will be required in exceptional instances. Sometimes a substitution for French or German (but not for both) will be allowed. Examinations on foreign languages precede preliminary Ph D candidacy examinations.

Apply well in advance of any of the four quarters of the school year.

FEES AND FIRST YEAR AID

Tuition—\$10 per quarter hour for all students. Room—men \$30 to \$74 per quarter, women \$40 to \$100. Board—\$110.

A limited number of fellowships and assistantships are available. Apply well in advance to Dean of the Graduate School.

FIELDS OF STUDY FOR THE PH D

Anatomy Neuroanatomy, basic oncology. Minors may be taken in cognate fields. Prerequisites: general biology, inorganic chemistry, organic chemistry, physics, English. Recommended: comparative anatomy, histological techniques, embryology. Program administered by College of Medicine (Houston). Faculty: 3 full time, 2 part time, 3 graduate students enrolled.

Biochemistry Radiobiology, clinical chemistry. Minors may be taken in cognate fields. Prerequisites: fundamental physics, biology, mathematics through calculus, two years of foreign language, majors in physics or biology who have chemistry as a minor may register only with the approval of the department. College of Medicine (Houston) administers the program. Faculty: 8 full time, 3 part time, 5 graduate students enrolled.

Chemistry Physical, organic, analytical biochemistry. Prerequisites: general, analytical, and organic chemistry, ten additional hours in chemistry required. Faculty: 8 full time, 3 part time, 11 graduate students enrolled.

English Seventeenth century English literature, Browning, American drama, modern poetry. Prerequisites: undergraduate English major. Faculty: 9 full time, 17 part time, 1 Ph D candidate enrolled.

Microbiology Immunology, immunochemistry, medical mycology, virology, bacterial physiology. Minors may be taken in cognate fields. Prerequisites: adequate preparation in biology, zoology, general and analytical chemistry, or

organic chemistry, basic physics, and general bacteriology and immunology. Recommended by: gene, genetics, botany, zoology, and general bacteriology and parasitology. College of Medicine (Houston) administers the program. Faculty: 4 full time, 2 part time, 3 graduate students enrolled.

Pharmacology Toxicology, biochemopharmacology. Minors may be taken in cognate fields. Prerequisites: 7 courses in chemistry, 3 in physics, 3 in biology, mathematics (see catalogue). Recommended: additional courses in chemistry and biology. Program administered by College of Medicine (Houston). Faculty: 4 full time.

Physiology Neurophysiology, cardiovascular physiology. Minors may be taken in cognate fields. Prerequisites: chemistry, physics and biology (preference generally given to majors in one of these subjects). Program is administered by the College of Medicine (Houston). Faculty: 4 full time, 1 graduate student enrolled.

Boston College

CHESTNUT HILL 67, MASSACHUSETTS

Boston College Graduate School

Established 1923, although graduate instruction had been offered earlier. Offers programs leading to Ph D, D Ed, M A, M S, M A in teaching, M Ed and to a Certificate of Advanced Educational Specialization. The doctoral degree is now confined to the following departments: Economics Education (Ph D and D Ed), and History. Graduate School dedicated to cultivating primary research and to interpreting, organizing and communicating the results of both primary and solid secondary research. In administration the Dean is assisted by an advisory academic council and the chairmen of all departments granting graduate degrees.

Specialized departmental libraries in addition to University libraries. Graduate students have access to Boston Public and Harvard University libraries, and to Boston Athenaeum. Graduate courses in geophysics taught at Boston College Seismological Station at Weston.

Summer and evening courses. 5 Ph D s awarded in 1956-7.

Residence requirement for doctorate at least one year of residence during which the candidate must be registered at the University as a full time student

Transfer requirements graduate work completed at other approved institutions may be offered in partial fulfillment of the requirements with approval of chairman and dean

ADMISSION REQUIREMENTS

Applicants accepted on the basis of a masters degree in which course work has shown promise of doctoral proficiency, or on the basis of outstanding undergraduate record Personal interview with departmental representative and two letters of recommendation required

All candidates for the Ph D must pass a reading examination in both French and German In addition to the two modern languages, Latin also is required for majors in medieval history Substitution can be made with permission All applicants must take GRE Aptitude Test

Recommended is a background in scholastic philosophy A departmental qualifying test is recommended in some cases

Apply to Dean of the Graduate School by March 1 for first semester, by December 1 for second semester

FEES AND FIRST YEAR AID

Tuition—\$25 per semester hour

A number of teaching fellowships providing a stipend of \$1,500 per annum with the remission of tuition A number of research assistantships (in physical sciences), providing a stipend of \$1,600 \$1,800 with remission of tuition Also a number of assistantships, providing a stipend of \$1,200, assistants are responsible for all charges Apply to Dean of the Graduate School before March 15

FIELDS OF STUDY FOR THE PH D

Economics Economic history, economic theory and its history, money and banking, statistics, foreign trade A number of related courses can be taken in Department of History and Government Prerequisites students admitted on their undergraduate records must have 18 21 semester hours of upper division courses in economics, those with a masters degree in economics are admitted on the basis of their perform-

ance in their graduate courses Faculty 9 full time, 1 part time 11 Ph D graduate students enrolled

Education History and philosophy of education educational psychology and measurement, guidance and measurement, educational administration and supervision, curriculum and instruction A number of courses can be taken in a related department Prerequisites students admitted on their undergraduate record must have 18 21 semester hours of upper division courses in education, those with a masters degree are admitted on the basis of their performance in their graduate courses D Ed also awarded in this field of study under Department of Education Faculty 17 full time, 6 part time 9 Ph D, 14 D Ed graduate students enrolled

History Medieval history, modern European history, English history, American history (political, social, diplomatic) Related courses in other graduate departments may be taken Prerequisites students admitted on the basis of their undergraduate record must have 18 21 semester hours of upper division course work in history, those with a masters degree in history are admitted on the basis of their graduate course work Qualifying examination in Latin required of students selecting medieval history as their major field Faculty 10 full time, 1 part time 8 Ph D graduate students enrolled

Boston University

BOSTON, MASSACHUSETTS

The Graduate School

The Boston University Graduate School was established in 1874 Its primary concern has been the training of teachers and the stimulation of research The academic program is established by its faculty, and administration is in the hands of a nine member board taken from the faculty The faculty of the Graduate School is drawn largely from the College of Liberal Arts faculty, although faculty members of other schools and colleges in the University are also used

A School of Medicine offers the M D, School of Theology, the Th D, School of Education, the Ed D, School of Fine and Applied Arts, the Doctor of Musical Arts

Human relations center, African Research and Studies Program at the graduate level, laboratories specializing in optics research

Men and women Summer and evening courses 60 Ph D's awarded in 1956-7

Residence requirements for the doctorate 48 semester hours of credit must be earned beyond the master's degree or its equivalent

Not more than 18 hours of credit can be transferred from other schools unless the credits come from other parts of Boston University

ADMISSION REQUIREMENTS

Reading knowledge of two foreign languages, one of which shall be French or German and the other selected by the department No candidate is allowed, except by petition to the Board, to register for more than 30 hours of graduate work until he has satisfied the departmental language requirements

GRE and/or MAT required in Department of Psychology

Apply to Secretary of Admissions Office of the Dean, Boston University Graduate School, 725 Commonwealth Avenue, Boston, at least ten days before the first day of registration

FEES AND FIRST YEAR AID

Tuition—\$400 per semester for full time students (12-18 hours is considered full time), \$25 per semester hour for part time study, plus fees Room—\$200 to \$385 for men, for women—in co-operative house \$468 with board, in a dormitory, \$600 to \$745, with board Board for men—\$295 \$440

Teaching fellowships with stipends of \$1,200 \$1,500 in cash are available in eleven departments Teaching fellows may also receive scholarships covering tuition and laboratory fees Recipients carry nine or less hours of graduate work per semester and work 15 hours per week in the departments All departments offer \$800 assistantships applicable toward tuition They may carry full time graduate work and are assigned duties requiring not more than 15 hours per week Other miscellaneous scholarships and fellowships available to those who apply by March 15 to the Graduate School

FIELDS OF STUDY FOR THE PH D

Anatomy Neurology, histology, embryology, gross anatomy Prerequisites M.A., or equivalent,

background in biology, physics, or chemistry Faculty 5 full time, 2 part time

Biochemistry Biochemistry of cancer, enzymes, nucleic acids, steroids, immunochemistry, blood groups, mathematical genetics, intermediate metabolism, and chemistry of urolithiasis Prerequisites inorganic, organic, and physical chemistry, quantitative analysis, calculus, analytical geometry, anatomy, and medical biochemistry (courses should include laboratory work, where required), M.A., or its equivalent Recommended courses in microbiology or bacteriology, physics, qualitative organic chemistry, instrumentation, organic synthesis, and statistics Faculty 3 full time, 2 part time 17 graduate students enrolled

Biology Vascular physiology, cytology, endocrinology, entomology, parasitology, ornithology, botany, microbiology, aquatic ecology, mammalogy, experimental biology Prerequisites M.A. in biology, or its equivalent Administered by Department of Medical Sciences Faculty 12 full time, 6 part time 31 graduate students enrolled

Chemistry Organic, inorganic, physical, and analytical chemistry Prerequisites M.A. in chemistry (or its equivalent), general chemistry, quantitative analysis organic chemistry, physical chemistry (calculus prerequisite), physics, mathematics through calculus Recommended six or more hours of advanced chemistry courses Faculty 8 full time, 1 part time 26 graduate students enrolled

Church History History of Christian institutions or Christian biography, the Church in the Roman world, the Church in the Middle Ages, the Church in the Reformation, the Church in the modern world the Church in America, the Church in the East Prerequisites S.T.B., or its equivalent The candidate shall elect at least 9 semester hours of directed study or research in his area of concentration The History Department course, The Study and Writing of History, will be accepted in partial fulfillment of this requirement Th.D. is also awarded in this field Faculty 3 full time, 1 part time 16 graduate students enrolled Program administered by the School of Theology

Economics Economic theory and its history, economic history, labor economics, money and banking, public finance, corporation finance, underdeveloped areas, transportation, foreign trade and investment, statistics Prerequisites M.A., or

its equivalent, in economics, intermediate economic theory, and statistics Recommended candidate shall earn at least 30 semester hours of credit in economics, subject to the approval of the major instructor, the remaining hours may be chosen from allied fields such as sociology, history, and government The candidate's attention is also called to the possibility of selecting up to 10 hours of unlisted professional courses in such fields as accounting, insurance, management, and marketing

Ecumenics, Mission, and World Religions Prerequisites STB, or its equivalent Recommended experience in interdenominational or missionary work ThD also awarded in this field Faculty 2 full time, 1 part time 1 graduate student enrolled

English English language, English literature, American literature Prerequisites M.A. in English, or its equivalent Faculty 14 full time, 1 part time 83 graduate students enrolled

Fine Arts Classical, early Christians, medieval, Renaissance of Italy, Baroque, modern, American, and French art Prerequisites master's degree in fine arts or its equivalent, 6 hours of history, 12 hours of literature, 6 of philosophy Recommended European travel, actual participation at one time or another in one of the branches of creative arts Faculty 3 full time, 1 part time 15 graduate students enrolled

Geography Physical regional, and systematic geography Prerequisites undergraduate preparation in general geography and geology, meteorology, climatology, cartography, and closely related fields of study, seminar in field, or geography and field techniques and problems Recommended geomorphology and statistics Faculty 4 full time, 2 part time 10 graduate students enrolled

Geology Mineralogy and crystallography, petrology and petrography, geomorphology and meteorology area geology, historical geology and paleontology, economic geology Prerequisites 54 hours in geology plus one year of college physics, mathematics, and chemistry Faculty 5 full time, 1 part time 22 graduate students enrolled

Germanic Languages and Literature German literature Prerequisites 3 years of college study in German, with a minimum of 24 semester hours of credit, Gothic, Old High German, Middle High German, Anglo-Saxon history of German language, Germanic philology A reading

knowledge of one of the following is desirable Dutch, Danish, Norwegian, Swedish, Old Icelandic Faculty 4 full time 6 graduate students enrolled

Government American Government and politics, state and municipal government, international relations and organization, political theory, public administration and public policy, government and politics of Africa Prerequisites M.A. in government, or its equivalent Faculty 7 full time, 2 part time 3 graduate students enrolled

History European and American History Prerequisites M.A. in history, or a minimum of 15 semester hours of graduate work in the field, undergraduate preparation in economics, government, and literature to the extent of approximately 15 semester hours Deficiencies shall be made up without credit toward the requirements for the degree Faculty 12 full time, 6 part time 31 graduate students enrolled

Mathematics Mathematical statistics, differential equations Prerequisite M.A. in mathematics, or its equivalent Faculty 5 full time, 7 part time 31 graduate students enrolled

Microbiology Prerequisites M.A. or its equivalent, quantitative analysis, and general bacteriology Recommended bacteriology, immunology, and parasitology Faculty 3 full time, 1 part time 3 graduate students enrolled

Music Musicology and music education Prerequisites—musicology M.M. or A.M., with major in music Theory 20 hours (including 4 hours of composition and 4 hours of counterpoint), history and literature of music 12 hours, musicology seminar, 6 hours Humanities, natural and social sciences 50 hours, and advanced courses in music education Also required music education, background in teaching experience satisfactory to the graduate committee Doctor of Musical Arts is also awarded in this field Administered by the School of Fine and Applied Arts Faculty 20 full time, 3 part time 24 graduate students enrolled

New Testament The Gospels, Acts and Paul, Hebrews and general Epistles, Revelation of John, eschatology, canon and Testament Prerequisites 60 semester hours of theological STB program, including introduction to the New Testament, a synoptic Gospel course, and one other in the New Testament, Greek and Hebrew, in addition to French or German (preferably the latter) Recommended Old Testament back

ground and program coordinated with theology and church history preferably Th.D. is also awarded in the same field Administered by School of Theology Faculty 1 full time, 3 part time 13 graduate students enrolled

Old Testament Old Testament introduction and canon, history of Israel, including archaeology, religion of Israel, Old Testament languages (Hebrew and Aramaic) Prerequisites STB or its equivalent Candidate should elect courses in the new Testament to insure a mastery of its literature, and he should also have a reading knowledge of New Testament Greek. Th.D. also awarded in this field Program administered by the School of Theology Faculty 3 full time 10 graduate students enrolled

Pathology Prerequisites M.D. or D.V.M., or student in good standing in an approved medical or veterinary school, general pathology Faculty 1 full time

Pharmacology General pharmacology chemotherapy, metabolic actions and metabolism of drugs autonomic nervous system, carcinogenesis kidney function central nervous system Prerequisites M.A., or its equivalent, adequate background with courses in chemistry, physics, mathematics, and biology Faculty 3 full time, 4 part time 5 graduate students enrolled

Philosophy Metaphysics, social philosophy, philosophy of religion Combined program with the graduate committee of the School of Education to offer field of study in philosophy of education Prerequisites M.A., or its equivalent, at least 12 hours of undergraduate philosophy courses with a grade of B or better, third language for research if needed, substitute classical Greek for French, subject to departmental approval Recommended history of philosophy, logic, ethics general psychology, and problems of philosophy Faculty 10 full time 39 graduate students enrolled

Philosophy of Education Combined program of philosophy and education for a Ph.D. in philosophy of education Prerequisites M.A. in philosophy or education or M.E. in education, or its equivalent, 1 year of successful teaching experience or internship under the direction of the Philosophy of Education committee Faculty 5 full time, plus the faculty of the Philosophy Department and the School of Education

Physics Geometrical and physical optics (including the use of high speed digital computers),

communication theory, nuclear physics, foundations of quantum mechanics, theory of irreversible processes, and solid state physics Prerequisites M.A., or its equivalent, tests administered by department Faculty 6 full time, 10 part time 26 graduate students enrolled

Physiology General, cardio-vascular, and respiratory physiology Recommended histology, comparative anatomy, and biostatistics Faculty 4 full time, 1 part time 6 graduate students enrolled

Social Ethics and Sociology of Religion Prerequisites acceptable foundation courses in the social sciences, plus broad liberal arts training and the STB degree, or its equivalent, in the theological studies Th.D. also awarded in this field Program administered by the School of Theology Faculty 3 full time, 1 part time

Systematic Theology and Philosophy of Religion Prerequisites STB, or its equivalent. Recommended a good concentration of college courses in philosophy Faculty 2 full time, 3 part time 24 graduate students enrolled

NOTES

Teaching courses are available in social studies, secondary mathematics, science in secondary schools, remedial reading in high school and college, English, and foreign languages

Polytechnic Institute of Brooklyn

BROOKLYN 1, NEW YORK

The Graduate School

Founded in 1853 as the Brooklyn Collegiate and Polytechnic Institute The present name was adopted in 1889 The first master's degrees in science were conferred in 1902, the first doctorate in 1935

Having no resident facilities, the Institute offers the bulk of its work to employees of industrial and governmental institutions in the New York area on a part time basis There are nearly 2,000 part time graduate students and 150 full time.

It is privately endowed and enrolls men primarily Summer and evening courses. 33 Ph.D.s

awarded in 1956-7

The minimum residence requirement for the doctorate is one year of full time residence or its equivalent in part time residence

Transfer students must fulfill the minimum residence requirements for degrees

The institution operates a microwave research institute, a polymer research institute, and an aerodynamics research laboratory at Freeport, Long Island

ADMISSION REQUIREMENTS

Baccalaureate degree in the field in which graduate degree is sought Also specific preparation for graduate work in his major interest

Ability to use German as working tool for scientific research For the doctorate the student must satisfy the Graduate Language Board that he possesses a reading knowledge of German, the Board may substitute another foreign language upon recommendation of the major department

Recommended professional experience beyond that represented by baccalaureate degree

Apply at any time to Graduate School

FEES AND FIRST YEAR AID

Tuition—\$475 per semester, \$33 per semester hour for part time programs Laboratory fees average about \$50 per year

A number of teaching fellowships are available with stipend of \$1,500 per academic year and 15 to 20 hours of work per week Also a limited number of industrial fellowships Apply for fellowships with application for admission

FIELDS OF STUDY FOR THE PH D

Aeronautical Engineering and Applied Mechanics Aerodynamics and structure of air planes Faculty 15 full time, 5 part time 12 part time graduate students, 1 full time enrolled

Chemical Engineering Chemical technology, unit operations, thermodynamics Faculty 5 full time, 10 part time 10 part time graduate students, 4 full time enrolled

Chemistry Inorganic, organic, physical, analytical, and polymer chemistry Faculty 21 full time, 7 part time 82 part time graduate students, 31 full time enrolled

Electrical Engineering Field theory, microwaves, electronics, servomechanisms, heat power Faculty 36 full time, 55 part time 49 part time graduate students, 2 full time enrolled

Mechanical Engineering Fluid mechanics, thermodynamics, jet propulsion, ferrous and non ferrous metallurgy, power plant maintenance and machine design Faculty 26 full time, part time 5 part time graduate students enrolled

Physics Solid state physics, X ray, field theory Faculty 21 full time, 11 part time 17 part time graduate students enrolled

NOTES

Teaching fellowships call for teaching activities under the close direction of the permanent staff There are no formal courses in teaching techniques, but many appointments are conducted in such a way that the fellow obtains considerable experience and practice in teaching

Brown University

PROVIDENCE, RHODE ISLAND

The Graduate School

Established 1927 Graduate instruction formally established in 1887 Ph.D degree first conferred in 1889 Graduate instruction open to women in 1892 Administered by the faculty of the University

The Graduate Center provides housing for about 37 male graduate students and recreational facilities for all graduate students Divisional libraries of the biological sciences and of the physical sciences, mathematics, and engineering, notable collection of Americana, Museum of the American Indian, laboratories for high vacuum electronics, ultrasonic research, nuclear physics, engineering research, electronic computer, affiliation with American School of Classical Studies (Athens) and American Academy (Rome)

Men and Women Private control 43 Ph.D's awarded in 1956-7

Residence requirements for doctorate equivalent of three years of graduate study, including at least two semesters of full time study beyond the master's degree

ADMISSION REQUIREMENTS

Evidence of ability to do graduate work of high quality Undergraduate degree from an approved college Three letters of recommendation

Reading knowledge of at least two foreign languages (in addition to any language which may constitute major subject), ordinarily French and German, addition of Latin in Department of English

Recommended report of GRE and MAT for applicants in psychology

Apply at as early a date as possible, preferably by April 1, to Office of The Graduate School

FEEES AND FIRST YEAR AID

Tuition—\$800 per academic year Room—men \$150 per semester No university housing for women Board—\$225 per semester

Available to first year students scholarships covering tuition fees special scholarships of small cash stipend Fellowships up to \$1 400, plus tuition fees Teaching assistantships in almost all departments—cash stipends up to \$1 500, plus tuition Resident assistantships for women Pembroke College Apply to Office of the Graduate School on or before February 15

FIELDS OF STUDY FOR THE PH D

American Civilization Intensive study of history and culture of America by examining achievements in art, architecture, literature, music, economic and social history, political thought philosophy, religion science The Committee on American Civilization consists of faculty from these departments History, English, Music, Economics Biology, Political Science, American Literature Philosophy, Art Prerequisites general knowledge of American history history of Western Europe, history of philosophy, and history and literature of England 20 graduate students enrolled

Applied Mathematics Instruction includes courses in mathematic fundamentals and in particular fields of applied mathematics, emphasis of program is on ability to analyze physical situations by the use of mathematical tools, fluids, elasticity, plasticity, applied mechanics, mathematical methods of applied science Prerequisites undergraduate training in two of the following subjects—engineering, physics mathematics 43 graduate students enrolled

Biology Zoology physiology, bacteriology Prerequisites preparation in the biological sciences Recommended courses are physics, chemistry, mathematics 25 graduate students enrolled

Chemistry Physical, organic, inorganic Research programs in molecular and crystal structure, free radicals and very fast reactions, the properties of matter at temperatures down to that of liquid helium, heterogeneous catalysis, etc in physical and inorganic Chemistry of nitro and polynitro compounds, reactions of ethylene mines, stereochemistry and rearrangements in steroids, etc in organic Prerequisites fundamental courses on college level in general, analytical, physical, and organic chemistry, basic courses in physics mathematics, and biology as dictated by students' interest 41 graduate students enrolled

Classics Greek and Latin language and literature history, archaeology, art Prerequisites specialization in some branch of classical studies Recommended courses are art, religious studies history, philosophy 10 graduate students enrolled

Economics Economic theory and history of economic thought, corporations and trusts, international trade labor problems money and banking, economic history, public control of industry, public finance, comparative economic systems statistics business cycles Prerequisites preferably an undergraduate major in economics, but students from other fields of social sciences may be admitted 16 graduate students enrolled

Egyptology Fields of Egyptian language and literature Prerequisites undergraduate studies of ancient history, languages, etc Elementary knowledge of one Semitic language, preferably Akkadian or Hebrew Elementary knowledge of Greek. Competent reading knowledge of French and German 3 graduate students enrolled

Engineering Applied mechanics and materials, aerodynamics and thermodynamics, electronics and communications Prerequisites undergraduate training in engineering subjects—mechanics of materials and structures elementary electrical engineering, thermodynamics, fluid mechanics or hydraulics in four semester courses on the senior year level Required courses—mathematics through elementary differential equations, chemistry, physics, engineering drawing and descriptive geometry, mechanics 28 graduate students enrolled.

English English language and literature, American literature Prerequisites undergraduate concentration in English or American literature

ture or an adequate background with emphasis on the humanities for advanced study in literature. Latin required in addition to French and German. 59 graduate students enrolled

History Prerequisites basic training in history, but with attention to broad study in the humanities and social sciences 25 graduate students enrolled

History of Mathematics History of the exact sciences in antiquity and in the Middle Ages Prerequisites training in either mathematics and astronomy or classics and history 2 graduate students enrolled

Mathematics Analysis, algebra, and topology Prerequisites thorough basic training in mathematics 32 graduate students enrolled.

Modern Languages French, German, Italian, Spanish, linguistics Prerequisites ability to speak, write, and read major language of interest and an adequate knowledge of the corresponding literature Proficiency in reading a third language in addition to French and German Candidates in German may offer a second Germanic or Romance language, or Greek, Latin, or Russian. Candidates in the Romance field will offer a second Romance language Knowledge of Latin recommended 39 graduate students enrolled.

Philosophy Historical, but emphasis on contemporary philosophies Prerequisites adequate undergraduate training in philosophy Substantial knowledge of at least one subject other than philosophy 21 graduate students enrolled.

Physics Acoustics, including ultrasonics High vacuum electronics, including solid state and surface physics Experimental and theoretical physics Nuclear magnetic resonances Prerequisites an undergraduate major in physics, the elements of chemistry, mathematics through calculus and differential equations 45 graduate students enrolled.

Political Science American government, foreign governments, international politics, and organization. Prerequisites an undergraduate major in the social sciences or in political science 15 graduate students enrolled.

Psychology Experimental physiological psychology Prerequisites undergraduate major in psychology Candidates must have had at least one college course in each of these fields mathematics, chemistry, physics, biology All candidates must demonstrate acceptable facility in the

use of statistical methods GRE or MAT 19 graduate students enrolled

Religious Studies Ph.D. candidates will generally be expected to do systematic work in one or more of these departments Classics, Linguistics, History, Philosophy Prerequisites Ph.D. candidates specializing in the Old Testament will be expected to pursue studies in Hebrew, Aramaic, and Hellenistic Greek, and will be required to have a preliminary reading knowledge of Latin Those specializing in the New Testament will pursue studies in Hellenistic Greek, Hebrew, and either Aramaic or Syriac, and will be required to have a preliminary reading knowledge of Latin. 16 graduate students enrolled

Sociology Ph.D. candidates will offer sociological theory, research methods, and one or more of these substantive fields population, ecology, regional development Prerequisites adequate preparation in general sociology or a related social science field. 10 graduate students enrolled.

NOTES

Almost all faculty of professional rank engaged in teaching or research.

In almost every department a student may take some courses in related subjects

All Ph.D. candidates required to serve as teaching assistant, teaching associate, or part time instructor for one academic year

Bryn Mawr College

BRYN MAWR, PENNSYLVANIA

The Graduate School

Established 1885 First Ph.D. conferred in 1888 Comprises about one fifth of the student body of the College Work leading to Ph.D. and M.A. is offered in all but three departments Residence for women graduate students available

Men and women. 6 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate a minimum of three full years, two of them at Bryn Mawr

Special library collections, notably Goodhart Mediaeval Library Nursery school and Child

Study Institute provide opportunities for practical work in field of child development Special work offered in overlapping areas of the natural sciences Under reciprocal arrangement with University of Pennsylvania full time graduate students may take courses without payment of additional fees

ADMISSION REQUIREMENTS

Open to graduates in liberal arts Transcript and letters from two instructors and the Dean Recommended GRE Apply to Dean of Graduate School by September 30

FEES AND AID

Tuition—\$600 (\$200 per unit), after 1957 8, \$800 (\$300 per unit) Room—women \$950

For women resident scholarships, \$1,150, tuition scholarships, \$600, fellowships (after a year of graduate work), \$1,850, scholarships for foreign women, \$1,550 Coordination of the Sciences awards (open to men as well as women), \$1,150 and \$1,850 Grants in aid up to \$300 Loans also may be obtained Apply to Dean of Graduate School by March 1 for domestic awards, February 1 for foreign awards

FIELDS OF STUDY FOR THE PH D

Biology Morphology (cytology and embryology), physiology, bacteriology Prerequisites good undergraduate training in biology, zoology, or zoology and botany, general and organic chemistry, French and German Combined Ph.D programs with biochemistry and physics Faculty 5 full time, 1 part time 7 graduate students enrolled

Chemistry Organic chemistry, physical chemistry Prerequisites undergraduate preparation must include courses in inorganic, analytical, (qualitative and quantitative), organic, and physical chemistry, college physics and calculus, German and French or Russian Combined Ph.D programs with biochemistry, geology, physics, and mathematics Faculty 4 full time, 2 part time 7 graduate students enrolled

Classical Archaeology Aegean, Roman, and Near Eastern archaeology, sculpture, architecture, vase painting, numismatics, topography of classical sites (Only 2 seminars in any one year) Prerequisites undergraduate major in archaeology or two courses in archaeology and major in Greek Latin, or history of art, some

knowledge of Greek, German and another modern language Combined Ph.D programs with history of art and occasionally with anthropology Faculty 2 full time, 1 part time 8 graduate students enrolled

Economics Economic theory history of economic thought, international, governmental, labor economics, money and banking Prerequisites undergraduate major in economics, or in history or politics with minor in economics, two modern languages Combined Ph.D program with political science Faculty 3 full time 4 graduate students enrolled

Education Educational psychology, child development, principles of school guidance, clinical evaluation Prerequisites undergraduate liberal arts, including a laboratory course in psychology, French and German, statistics Combined Ph.D program with psychology Faculty 3 full time, 1 part time 7 graduate students enrolled

English Old and Middle, Shakespeare, Milton Restoration, Romantic, Victorian, American, Contemporary Prerequisites undergraduate major in English, including critical and historical study of several periods, and training in one other field of humanities, French and another modern language, Latin for Mediaevalists Recommended Latin Combined Ph.D programs with Latin and/or history (Mediaeval Studies) Comparative philology as minor with other language Faculty 9 full time 17 graduate students enrolled

French Poetry, novel, classicism, thought, philology Prerequisites undergraduate major in French of at least three years, including advanced work in literature, ability to present papers and discuss in French, German and either Italian or Spanish Combined Ph.D programs with comparative philology—minor only, other literatures Faculty 4 full time, 1 part time 5 graduate students enrolled

Geology Mineralogy, petrology, paleontology, stratigraphy, regional and structural geology Prerequisites undergraduate course in general geology and at least one course in a special area of geology, German and another modern language Recommended college training in allied sciences and mathematics Faculty 4 full time, 1 part time 7 graduate students enrolled

German Literature (novelle and drama), Germanic philology Prerequisites three years of

college German, including medieval, 18th and 19th century literature, and Latin For the M.A., French and either another modern language or Greek or Latin, for the Ph.D., French and a German dialect. Recommended Latin, Greek for philologists Combined Ph.D. programs with Mediaeval Studies, with English, comparative philology, minor only Faculty 3 full time, 1 part time 3 graduate students enrolled

Greek Epic and lyric poetry, tragedy, comedy, orators historians pre Socratics Plato, and history Prerequisites four years of college Greek, Latin, French and German, rigorous examination in Greek sight translation Combined Ph.D. programs with Latin and classical archaeology Faculty 3 full time 3 graduate students enrolled

History Ancient medieval, British, American, modern European. Prerequisites good undergraduate preparation in general history, the humanities, and social sciences, for medieval history a reading knowledge of Latin, for modern European history, one modern language, French and German with occasional substitutes Combined Ph.D. programs with Latin and English, Mediaeval Studies, political science Faculty 6 full time 9 graduate students enrolled

History of Art Early Christian, medieval, Near Eastern, Far Eastern Renaissance Baroque and modern art, art theory Prerequisites usually good preparation in art history, in case of exceptional candidates history or philosophy will be accepted, reading knowledge of two modern languages, preferably German and French Combined Ph.D. programs ancient art with classical archaeology, occasional combinations with philosophy, English, French Faculty 4 full time 3 graduate students enrolled

Italian Provençal, old Italian, Dante, Manzoni Prerequisites undergraduate major or minor, ability to read, write, and speak Italian, adequate knowledge of Italian classical literature, French and German with occasional substitutions Combined Ph.D. programs with other Romance languages, occasionally with history Faculty 1 full time

Latin Classical period literature and history, epigraphy, paleography, religion, medieval Latin Prerequisites undergraduate major or minor in Latin—at least three years, representative reading, French, German, Greek Combined Ph.D. programs with Greek, classical archaeol-

ogy, with English and history Mediaeval Studies Faculty 3 full time 5 graduate students enrolled

Mathematics Abstract algebra, differential and projective geometry, combinational and point set topology, variables and games, mathematical physics Prerequisites good undergraduate preparation in mathematics, or mathematics and physics, French and German Combined Ph.D. programs with physics philosophy Faculty 3 full time 1 part time 4 graduate students enrolled

Philosophy Systematic and historical philosophy (aesthetics, ethics, epistemology, metaphysics, logic, British empiricism, rationalism) Prerequisites undergraduate major, French and German with occasional substitutions Combined Ph.D. programs English, Greek, history offered as allied subjects Faculty 5 full time 10 graduate students enrolled

Physics Classical mechanics, thermodynamics, electricity and magnetism, wave phenomena quantum mechanics, atomic and nuclear structure Prerequisites undergraduate major in physics or in closely allied field (mathematics, chemistry, engineering), two modern languages, German and/or Russian and/or one Romance, oral qualifying examination Combined Ph.D. programs mathematics, coordination of the sciences (biology chemistry, psychology) Faculty 3 full time 4 graduate students enrolled

Political Science Political theory, government, constitutional and international law organization, public administration Prerequisites good undergraduate training in political science and related subjects, two modern languages, preferably French and German Combined Ph.D. programs economics history Faculty 4 full time 3 graduate students enrolled

Psychology Experimental, clinical, and social psychology, psychology of personality Prerequisites undergraduate work including statistics, experimental psychology with laboratory, personality, French and German, MAT, statistics Combined Ph.D. programs with education, child development and mental tests and measurements, Coordination of the Sciences (physics), other common allied subject philosophy Faculty 3 full time, 2 part time 10 graduate students enrolled

Social Work The social services (social welfare, history, policies international social secur-

ity), human growth and development (physical and psychological development, physical and mental disease, patterns of behavior, psychopathology), social work practice (casework, medical, psychiatric, children, and family), group work and community organization, social research. Prerequisites: major in a social science and at least one course in economics, political science, history, psychology, sociology, and anthropology, French for Ph.D. only, personal interview. Recommended statistics. Combined Ph.D. programs: some work in anthropology, sociology, psychology, and economics. Faculty: 3 full time, 16 part time. 47 graduate students enrolled.

Sociology and Anthropology Anthropological theory and history, major cultures, dynamics, ethnography, sociological theory, comparative social institutions. Prerequisites: good preparation in sociology and/or anthropology, some undergraduate training in another social science, German and another modern language. Combined Ph.D. programs: social psychology, economics, political science, history. Faculty: 2 full time, 2 part time. 4 graduate students enrolled.

Spanish Spanish literature from the Middle Ages to the present. Prerequisites: undergraduate major in Spanish, including representative reading French and German and adequate knowledge of Latin. Combined Ph.D. programs: candidates must offer work in a suitable allied field, e.g., any literature (ancient or modern), including medieval Latin, European or Spanish American history, classical or Romance philology. Faculty: 3 full time, 2 part time. 3 graduate students enrolled.

University of Buffalo

BUFFALO, NEW YORK

Graduate School of Arts and Sciences

Established 1939. Graduate work since 1923. Only definitely professional programs now operate outside the Graduate School, within it are all degree programs of the College of Arts and Sciences, the preclinical divisions of the School of Medicine, Engineering, Pharmacy, Nursing and the Roswell Park Division, also

certain programs in the School of Business and one joint program with the School of Education.

Allied divisions and degrees: School of Education, Ed.D., School of Medicine, M.D., School of Dentistry, D.D.S.

Outstanding poetry collection in original manuscripts. Psychological and speech clinics. Art school. Chronic Disease Research Institute. Institute for the study of malignant diseases. Affiliation with V.A. Hospital provides internships for clinical psychology students. Nuclear center with nuclear reactor in planning stage.

Dormitory facilities for both men and women. Summer and evening courses. 12 Ph.D.s awarded in 1956-7.

Residence requirements for doctorate: one year. Additional residence required by some departments.

Transfer requirements: work must be of acceptable quality and appropriate to student's program. Credits transferred may not constitute more than one-half of the total credits earned beyond the bachelor's degree.

ADMISSION REQUIREMENTS

General undergraduate average 1.5 (above C plus), personal letter outlining aims, one letter of recommendation, background appropriate to field of concentration. GRE by certain departments. Psychology requires MAT. Apply to Graduate School of Arts and Sciences at least one month before term begins.

FEES AND FIRST YEAR AID

Tuition—\$700. Room and 20 meals per week—\$755.

Graduate teaching and some research assistantships. Full tuition scholarships. Cash awards from \$200 to \$1,000. Two fellowships of \$1,000 plus tuition. Apply to departmental offices for teaching and research assistantships before March 15, to Graduate Office for scholarships and fellowships before March 15.

FIELDS OF STUDY FOR THE PH.D.

Anatomy Human anatomy, vertebrate histology, neuroanatomy, cellular ultrastructure. Prerequisites: bachelor's degree with evidence of superior work in biology. Faculty: 2 full time, 2 graduate students enrolled.

Bacteriology and Immunology Prerequisites: thorough grounding and preliminary prepara-

tion in biology (especially bacteriology), chemistry and physics, average of B (superior) in bacteriology and biology or other courses pertaining to the field. Faculty 4 full time 4 graduate students enrolled

Biochemistry Isolation, identification, and metabolism of tissue extractives, effects of nutrition on the biochemistry of hemoglobin and other metabolites, intermediary metabolism of carbohydrates and lipids, changes in the nature of serum proteins under certain reaction conditions. Prerequisites calculus and physical chemistry. Faculty 6 full time 7 graduate students enrolled

Biology Bacteriology, cellular biology, ecology, embryology, endocrinology, entomology, genetics, histology, invertebrate zoology, mycology, plant physiology, protozoology. Prerequisites 32 semester hours of biology, chemistry through organic, general college physics, calculus, reading knowledge of German or French. Roswell Park Division specializes in mammalian genetics, cytology, endocrinology, cell physiology and cytochemistry. Faculty 6 full time 12 graduate students enrolled

Business Administration Accounting, business organization, industrial relations, statistics, marketing. Prerequisites adequate background in accounting principles, economic principles, money and banking or financial organization, business law, corporation finance, private finance, or economics of corporations, economic statistics, marketing principles. Faculty 3 full time 1 graduate student enrolled

Chemistry Rates of precipitation reactions, analytical methods for the fission elements, neutron activation analysis, coordination compounds of the transition elements, phase studies of boron compounds, cyanoguanidines and oxamides, cyanogen reactions, organic derivatives of silicon, phosphorus and sulphur, halogenated mercaptans, chemotherapeutic compounds, isotopic exchange reactions, kinetics of organic reactions, chemical reactions in shock waves, physical chemistry of the fission process. Prerequisites differential and integral calculus, inorganic, organic and physical chemistry, qualitative and quantitative analysis, general average of B. Roswell Park Division specializes in bio- and immunochemistry. Faculty 8 full time 40 graduate students enrolled

Economics Economic theory, business cycles,

money and banking, public finance and taxation, government control of business, international economic problems, public utilities, transportation, labor problems, history of economic thought, economic development. Prerequisites bachelor's degree from accredited college of arts and sciences with major in economics or from a school of business administration which is a member of Assn. of Collegiate Schools of Business Administration. Faculty 5 full time 3 graduate students enrolled

English 14th and 15th centuries, the Renaissance and the 17th century, the 18th century, the 19th century, American literature, criticism, the drama, linguistics, modern literature. Faculty 9 full time 22 graduate students enrolled

History and Government Medieval Europe, Renaissance and Reformation, Europe 1760-1870, Europe since 1870, England since 1688, Latin America, the Colonies and the Revolution, United States since 1783, international relations, political theory (general and American), comparative government, Constitutional law, US government, political parties, public administration. Faculty 9 full time 13 graduate students enrolled

Mathematics Algebra, analysis, topology. Prerequisites, six semester hours of upperclass work in algebra, geometry, and analysis. Faculty 6 full time 54 graduate students enrolled

Pharmacology Influence of drugs on renal action, tracer studies with radioactive isotopes, absorption and excretion of anesthetic gases, thrombolytic drugs. Prerequisites GRE. Faculty 2 full time 3 graduate students enrolled

Pharmacy Pharmaceutical chemistry. Prerequisites B average. Faculty 5 full time 7 graduate students enrolled

Philosophy All traditional fields of philosophy, e.g., logic, theory of knowledge, theory of values, metaphysics, history of philosophy. School of Education awards Ed.D. (Philosophy of Education). Faculty 4 full time 15 graduate students enrolled

Physics Atomic and molecular, theoretical, and nuclear physics, investigation of the mechanical, thermal, optical, and electrical properties of materials. Prerequisites undergraduate major in physics is preferred, but students with exceptional record which includes advanced work in physics will be considered. Biophysics Dept. of Roswell Park Division also awards Ph.D.

Faculty 5 full time 37 graduate students enrolled

Physiology Cardio pulmonary, neural renal and metabolic physiology Prerequisites biology, physics, calculus organic and physical chemistry Roswell Park Division specializes in physiology related to the understanding and treatment of human disease Faculty 3 full time 7 graduate students enrolled

Psychology General experimental physiological social clinical, personality genetic developmental perception abnormal, counseling Prerequisites MAT, GRE, including Advanced Examination in psychology, undergraduate major in psychology, or the completion of such undergraduate courses as the department considers fundamental Faculty 15 full time 45 graduate students enrolled

Sociology Industrial research, sociology of teaching, bureaucracy sociology of religion sociology of professions, medical sociology Prerequisites knowledge of general sociology, social theory and elementary statistics Faculty 7 full time 9 graduate students enrolled

OFFERED BY ROSWELL PARK DIVISION

Biology Mammalian genetics cytology, endocrinology cell physiology cytochemistry Prerequisites 32 semester hours of biology, inorganic and either organic or introductory biochemistry, introductory physics, calculus reading knowledge of German, B average Faculty 5 full time

Biophysics Radiation physics molecular physics, theoretical biophysics experimental methods in biophysics physical aspects of cell growth Prerequisites general and three specialized fields of physics general biology, inorganic and organic chemistry, calculus reading knowledge of French, German, or Russian Recommended additional work in physics, physical chemistry histology, zoology, introductory biophysics, mathematics biochemistry Faculty 2 full time 1 graduate student enrolled

Chemistry Physical, organic, bio and immunochemistry, emphasis on the chemistry of biological systems Prerequisites see Chemistry in section above Faculty 5 full time

Physiology Fields of physiology related to the understanding and treatment of human disease Prerequisites general physics, inorganic, organic, and physical chemistry, quantitative analysis,

general physiology, mammalian physiology, biochemistry, calculus Faculty 3 full time 1 graduate student enrolled

NOTES

Interdivisional Seminar in College Teaching a two semester seminar for doctoral candidates who are teaching or preparing to teach, offered jointly by the Graduate School and the School of Education First semester is devoted to learning about the activities and services outside the classroom which enable the teacher to be an informed member of an educational community The second semester includes a study of problems related directly to classroom activities of college teachers

California Institute of Technology

PASADENA, CALIFORNIA

Established as a university in 1920 the Institute since its beginning has stressed the importance of research It has a staff of approximately 350 scientists and engineers actively engaged in research and about 450 graduate students This faculty student ratio provides opportunity for intimate association with creative workers

The Institute has extensive on campus facilities, including a computing center The following off campus facilities are available large telescopes of Mount Wilson and Palomar Mountain radio telescopes at Palomar and Bishop cooperative wind tunnel seismological laboratory, jet propulsion laboratory

Women admitted in exceptional cases only 58 Ph.D.s awarded in 1956 7

Residence requirement for doctorate at least one of the minimum three years of graduate study must be spent in residence

ADMISSION REQUIREMENTS

Applicant must, in general have received a bachelor's degree representing the completion of an undergraduate course in science or engineering substantially equivalent to one of the programs offered at the Institute

Certain options recommend GRE.

Apply as early as possible to Office of the

Graduate School

FEES AND FIRST YEAR AID

Tuition—\$918

A number of fellowships, scholarships, and graduate teaching or research assistantships are offered in each division. Scholarships, in general, carry tuition grants, assistantships carry cash stipends, fellowships provide both tuition and stipends. Graduate assistants are eligible for consideration for scholarship grants. Apply on the admission form before February 15.

FIELDS OF STUDY FOR THE PH.D.

Aeronautical Engineering Fluid mechanics, jet propulsion, solid mechanics and applied elasticity applied aerodynamics. Prerequisites equivalent of the BS requirements at C.I.T. Administered by Division of Engineering. Faculty 15 full time, 69 graduate students enrolled.

Astronomy Stellar spectroscopy, composition of the universe, nature and contents of our own galaxy and extra galactic nebulae, stellar evolution, radio astronomy, origin of the universe. Prerequisites equivalent of the BS requirements at C.I.T. Administered by Division of Physics, Mathematics, and Astronomy. Faculty 5 full time, 2 part time, 6 graduate students enrolled.

Biology Plant physiology, animal physiology (Earhart Plant Research Laboratory), psychobiology, embryology, biophysics, general biology, genetics (Drosophila and Neurospora collections), immunology, virology, chemical biology, biochemistry. Prerequisites equivalent of BS requirements at C.I.T. Recommended GRE Administered by Division of Biology. Faculty 32 full time, 1 part time, 24 graduate students enrolled.

Chemistry and Chemical Engineering Inorganic, analytical, physical, organic, theoretical chemistry and chemical engineering. Prerequisites equivalent of BS requirements at C.I.T. Administered by Division of Chemistry and Chemical Engineering. Faculty 35 full time, 84 graduate students enrolled.

Civil Mechanical Engineering and Applied Mechanics Sanitary, hydraulic, structural, mechanical, metallurgical engineering, solid mechanics, jet propulsion, solid, fluid, and thermodynamics, engineering science. Prerequisites equivalent of BS requirements at C.I.T. Administered by Division of Engineering. Faculty 33 full

time, 62 graduate students enrolled.

Electrical Engineering Communication and information theory, servomechanisms, microwave, physical electronics and field theory, machine computation and engineering analysis. Prerequisites equivalent of BS requirements at C.I.T. Administered by Division of Engineering. Faculty 15 full time, 46 graduate students enrolled.

Geology Economic geology, geochemistry, geomorphology, geophysics, glaciology, paleoecology, paleontology, petrology, seismology, structural geology. Prerequisites equivalent of BS requirements at C.I.T. Recommended GRE. Administered by Division of Geological Sciences. Faculty 20 full time, 1 part time, 44 graduate students enrolled.

Mathematics Algebra, theory of numbers, probability, topology, analysis, numerical analysis, applied mathematics. Prerequisites equivalent of BS requirements at C.I.T. Administered by Division of Physics, Mathematics, and Astronomy. Faculty 12 full time, 8 graduate students enrolled.

Physics Experimental and theoretical research in classical and nuclear physics, high energy nuclear physics, cosmic rays, precision measurements of gamma and beta rays, elementary particle studies, optical spectra and transition probabilities, cryogenics, problems related to stellar and interstellar matter, cosmology, astrophysics, quantum theory, and nuclear structure. Prerequisites equivalent of BS requirements at C.I.T. Recommended GRE Administered by Division of Physics, Mathematics, and Astronomy. Faculty 31 full time, 104 graduate students enrolled.

University of California

LOS ANGELES, CALIFORNIA

Graduate Division, Southern Section

In 1936 authority was granted to give work leading to the Ph.D. for the first time at Los Angeles. See Northern Section *infra* for the other main section of the University, which also provides instruction on the graduate level at campuses in Davis, Mount Hamilton, and San Francisco.

Ed.D., M.D., D.P.H., and D.V.M. also awarded by allied divisions.

Citrus Experiment Station, Scripps Institution of Oceanography, special collection of 66,000 items, featuring English culture of the 17th, 18th, and 19th centuries and the history of Montana Summer courses

Residence requirement for doctorate 2 academic years (or 4 semesters) at the University, one year of which (ordinarily the second) must be in continuous residence

ADMISSION REQUIREMENTS

Bachelor's degree based on a curriculum that includes the requirements for regular graduate status in the department of student's major subject GPA of 2.5 in junior and senior year and in all upper division courses of proposed major

Two foreign languages needed before the qualifying examinations, but not necessarily for admission GRE recommended

Apply to Dean of the Graduate Division, University of California, Los Angeles 24 California, not later than August 1 for Fall semester, December 1 for Spring semester

FEES AND FIRST YEAR AID

Tuition—out of state \$150 per semester, in state free No University accommodations for graduate students Write Housing Office, Room 169, Administration Building, for listing of private facilities for rent University cafeteria is open to graduate students

Scholarships in various amounts, teaching as assistantships, with stipends of \$1,650 per year, research assistantships and loans also available Apply to Dean of the Graduate Division, Los Angeles, before February 20 for fellowships and scholarships Apply to department chairman for teaching and research assistantships not later than March 1 For loans apply to Student Loan Office, 281 Administration Building

FIELDS OF STUDY FOR THE PH.D.

Anatomy Prerequisites courses in gross anatomy of the human body, research, microscopic anatomy, basic neurology 11 graduate students enrolled

Anthropology 35 graduate students enrolled

Anthropology Sociology Program administered by the Department of Anthropology and Sociology, which also administers the program in Anthropology supra 1 graduate student enrolled

Art History Prerequisites comprehensive examination in art history required unless student has the M.A. in art history from this department, French and German, except for Oriental Art specialists or those specializing in Spanish or Latin American art, who may substitute Spanish for French. 58 graduate students enrolled

Biological Chemistry Prerequisites preliminary examination in chemical principles, organic chemistry and biological chemistry, reading knowledge of German bachelor's degree in biological chemistry, chemistry, or a life science, courses in general chemistry, quantitative analysis, elementary biological chemistry, physical chemistry, at least two semester hours of physical chemistry laboratory, organic chemistry, college algebra, trigonometry, and differential and integral calculus, general physics, and two of the following—bacteriology, botany, zoology Other higher science courses and statistics also recommended 6 graduate students enrolled

Biophysics Prerequisite completion of interdepartmental curriculum in biophysics at this University, or equivalent training and experience in biology, physics, chemistry, and mathematics Administered by the School of Medicine 10 graduate students enrolled

Botanical Science Prerequisites substantially the same courses must be completed as a graduate of this University with a major in botany or in the plant science curriculum of the College of Agriculture. 28 graduate students enrolled

Business Administration Prerequisite working knowledge of core course areas which provide the basis of a B.S. in the field. 157 graduate students enrolled

Chemistry Prerequisites orientation examination in inorganic analytical chemistry, organic, and physical chemistry, reading knowledge of Russian may be substituted for French or German 98 graduate students enrolled

Economics Prerequisites semester course in accounting, statistics, American economic history, and European economic history 30 graduate students enrolled

Engineering Aerodynamics, biotechnology, ceramics, chemical unit operations and processes, communications, electronics fluid mechanics, heat transfer, mass transfer, mechanics, nuclear processes, petroleum production, physical metallurgy, production methods and management, properties of materials, radiation, sanitation, ser

vomechanisms, soil mechanics, structures, and thermodynamics 452 graduate students enrolled.

English Prerequisites undergraduate major in English ordinarily written statement of preparation in French, German, and Latin, reading test in one modern foreign language at beginning of graduate work. 121 graduate students enrolled.

French Prerequisites undergraduate major in French, reading and speaking knowledge of an other Romance language reading knowledge of Latin. Qualifying examinations cover all periods of French literature with specialization in one 6 graduate students enrolled.

Geography Prerequisites undergraduate degree in geography, including about 30 semester hours of upper division work in geography distributed mainly among regional or systematic courses Preliminary examination sometimes required 26 graduate students enrolled.

Geology Prerequisites at least the minimum number of credits required for an undergraduate major in geology at this University Examination sometimes required upon entrance 64 graduate students enrolled.

Germanic Languages Prerequisites completion of an undergraduate major in German, or its equivalent, with a 2.5 GPA. Placement examination sometimes required. 17 graduate students enrolled

Hispanic Languages and Literature Prerequisites completion of undergraduate major in Spanish, or its equivalent, with a 1.75 GPA, Portuguese, at least 2 years of high school Latin, reading knowledge of French (and another foreign language for admission to candidacy) 4 graduate students enrolled

History Prerequisites undergraduate major in history reading knowledge of one foreign language at beginning of study 103 graduate students enrolled.

Horticultural Science See botanical science supra 23 graduate students enrolled.

Infectious Diseases Prerequisites undergraduate major in a field related to infectious diseases. Administered by the School of Medicine. 7 graduate students enrolled.

Mathematics Qualifying examinations, including one in basic analysis one in algebra, and one in particular specialty 102 graduate students enrolled.

Meteorology Prerequisites bachelor's degree,

with major in meteorology, or equivalent, with a 2.5 GPA, preliminary examinations 24 graduate students enrolled

Microbiology This is a series of offerings in a field rather than a department. Prerequisites completion of an approved undergraduate major in bacteriology, biochemistry, botany, microbiology, or zoology Research done in agricultural bacteriology, bacteriology, biochemistry, cryptogamic botany, marine or fresh water microbiology, mycology, phytoplankton, zoology, and zooplankton Certain courses may be taken at La Jolla or Riverside campuses. 26 graduate students enrolled

Music Prerequisites undergraduate major in music, or equivalent, written examination in dictation, harmony, counterpoint, orchestration, history, and literature of music. 54 graduate students enrolled

Oceanography Courses given at La Jolla Write director of Scripps Institution of Oceanography for additional details Prerequisites baccalaureate major in mathematics, meteorology, engineering, or one of the physical or biological sciences, at least one year course in each of the following—mathematics, physics, chemistry, and one of the biological sciences, preparation in foreign languages sufficient to pass a reading examination in German and French by the beginning of the second year, preparation in physical and organic chemistry, integral calculus, and geology 29 graduate students enrolled.

Philosophy Prerequisites reading knowledge of French, German, Greek, or Latin, at least 24 upper division units in one of the following fields—natural sciences, social sciences, life sciences humanities (excluding philosophy) 34 graduate students enrolled.

Physics Write Department of Physics for special brochure. 115 graduate students enrolled

Physiological Chemistry Prerequisites bachelor's degree in agriculture, biochemistry, botany, chemistry, microbiology, physical biological science, or zoology, courses in general chemistry, quantitative analysis, physical chemistry, with at least 2 additional units of laboratory, organic chemistry, analytic geometry and calculus, general physics general biology Recommended advanced quantitative analysis, qualitative organic analysis general biochemistry, physical chemistry, analytical geometry and calculus, statistics, general zoology, reading knowledge of German

during first semester (French during third) Program administered by the Department, which is part of the School of Medicine 9 graduate students enrolled

Physiology Prerequisites bachelor's degree in a biological or physical science, or in the premedical curriculum provided the latter includes 6 semester units of college mathematics, 8 of physics, 16 of chemistry (including quantitative analysis and organic chemistry), and 12 of zoology (including comparative vertebrate anatomy), preliminary examinations during first semester Program administered by the Department, which is part of the School of Medicine 8 graduate students enrolled

Political Science Prerequisites undergraduate major in political science or equivalent, upper division courses distributed among at least four different fields of political science 53 graduate students enrolled

Psychology Write Department for prerequisites 156 graduate students enrolled

Romance Languages and Literature Prerequisites undergraduate majors in French, Italian, or Spanish, reading knowledge of Latin, French, German, Italian and Spanish (by time of admission to candidacy) If principal interest is literary the student must show knowledge of the particular literatures and of the philology of the major field If student's principal interest is philological he must show a specific knowledge of Vulgar Latin, Old French, Old Provençal, Old Italian, and Old Spanish, as well as a specific acquaintance with French, Italian, Spanish, and Old Provençal literatures with a special emphasis on the literature of the language of the main interest 7 graduate students enrolled

Sociology See Anthropology and Sociology supra 28 graduate students enrolled

Zoology 104 graduate students enrolled

Graduate Division, Northern Section BERKELEY, CALIFORNIA

The Northern Section of the Graduate Division of the University of California embraces all graduate activities of the University in Berkeley, Davis, Mount Hamilton, and San Francisco For the Southern Section see supra The Ph.D. has been awarded at Berkeley since 1883 Through June, 1955, the University had granted 4394

Ph.D.'s, 2 D.Eng.'s, 194 D.V.M.'s, 582 J.D.'s, 8 J.S.D.'s, 3,099 M.D.'s, 10 D.P.H.'s, and 225 Ed.D.'s The D.L.S. is also awarded

The Council of the Graduate Division, which is a standing committee of the Northern Section of the Academic Senate, exercises administrative and coordinating functions Government of the entire University is entrusted to a Board of Regents of 24 members, of whom 16 are appointed by the Governor and 8 are ex officio members

East Asiatic Library containing 225,000 volumes of Chinese, Japanese, and Korean material, the Luck Observatory at Mount Hamilton, the George Williams Hooper Foundation for Medical Research, the School of Dentistry at San Francisco Schools at Berkeley include those of Business Administration, Criminology, Education, Forestry, Law, Librarianship, Optometry, Public Health, and Social Welfare

Residence requirement for doctorate a minimum of two years

ADMISSION REQUIREMENTS

Holders of the bachelor's degree from institutions of acceptable standing are accorded admission to the Graduate Division, Northern Section, subject to the following qualifications (1) that the standards of the degree in question are equivalent to those maintained at the University of California, (2) that the record of scholarship is satisfactory, and (3) that the student can be accommodated in the field in which he wishes to study Applications for admission, together with official transcripts of previous academic study, must be filed with the Office of the Dean of the Graduate Division 102 Administration Building, University of California Berkeley 4, not later than July 15 for the Fall semester and December 15 for the Spring semester

FEES AND FINANCIAL AID

Tuition—out of state \$150 per semester, in state free All students pay an incidental fee of \$50.00 each semester, plus a \$3.00 fee for membership in the Associated Students of the University of California

Application blanks for fellowships and graduate scholarships will be available each year about the middle of November at the office of the Dean of the Graduate Division and must be filed, together with all required credentials, in that office on or before February 7

Application blanks for teaching and research assistantships may be obtained from the departments concerned

FIELDS OF STUDY FOR THE PH D

Agricultural and closely related fields listed below are offered at Davis, medical, dental, nursing, pharmaceutical, and related fields at San Francisco, astronomy at the Lick Observatory on Mount Hamilton. All others are given on the Berkeley campus on San Francisco Bay (For detailed information students are to send 25 cents [26 in California] to the Registrar) Requests for special school announcements may be addressed to the Dean of the Graduate Division.

Agricultural Chemistry
Agricultural Economics
Anatomy
Anthropology
Applied Mathematics
Astronomy
Bacteriology
Biochemistry
Biophysics
Biostatistics
Botany
Business Administration
Chemical Engineering
Chemistry
Child Development
Civil Engineering
Classical Archaeology
Classics
Comparative Biochemistry
Comparative Pathology
Comparative Pharmacology and Toxicology
Comparative Physiology
East Asiatic Studies
Economics
Education
Electrical Engineering
Endocrinology
Engineering Science
English
Entomology
Epidemiology
Genetics
Geography
Geology
German
History
History of Art

Home Economics
Irrigation Engineering
Latin American Studies
Librarianship
Linguistics
Mathematics
Mechanical Engineering
Medical Physics
Metallurgy
Microbiology
Mining
Music
Near Eastern Languages
Nutrition
Oriental Languages
Paleontology
Petroleum Engineering
Pharmaceutical Chemistry
Pharmacology
Philosophy
Physics
Physiological Chemistry
Physiological Optics
Physiology
Plant Pathology
Political Science
Psychology
Romance Literature Emphases on French, Italian, Spanish
Romance Philology
Slavic Languages and Literatures
Slavic Studies
Sociology and Social Institutions
Soil Science
Statistics
Zoology

(For full information write for a copy of the Announcement of the Graduate Division)

Carnegie Institute of Technology

PITTSBURGH PENNSYLVANIA

The first doctoral degree was awarded in 1932. The Ph.D. is granted by (1) College of Engineering and Science, (2) Graduate School of Industrial Administration, and (3) Department of Psychology in the Division of Humanistic Studies.

ies Residence requirement for doctorate one full year on campus

The College of Engineering and Science admits men and women. Graduate work is administered under a dean of graduate studies operating with a Committee on Graduate Degrees composed of heads of departments concerned.

Laboratories—American Petroleum Research, Coal Research, Metals Research, for fundamental and basic research on metals, Digital Computing Center Nuclear Research Center with synchro cyclotron Carnegie Library and Museum nearby Affiliations with industry and national laboratories Full dormitory space for married and unmarried graduate students Evening courses 43 Ph.D.s awarded in 1956-7

Graduate School of Industrial Administration is designed to provide advanced training in the areas of administration and economics, especially for men with strong backgrounds in engineering, science and mathematics. It specializes in the relationships of mathematics statistical method, and the behavioral and social sciences to the problems of business administration, also offers considerable advanced work in the areas of operations research and mathematical and industrial economics as well as the behavioral sciences Graduate houses are available for living accommodations Ph.D. is offered in (1) mathematics and industrial economics and (2) industrial administration, for men looking toward careers in teaching and research 2 Ph.D.s awarded in 1956-7

College of Engineering and Science

ADMISSION REQUIREMENTS

Completion of a regular four year course in the subject concerned Undergraduate record must be well above average, nearly always B or better

Apply to Office of Dean of Graduate Studies

FEES AND FIRST YEAR AID

Tuition—\$800 per year Room and board—men and women, \$690-\$730

A large number of fellowships, one third time and one half time teaching assistantships one-third time and one-half time research assistantships, and scholarships Apply to Office of Dean

of Graduate Studies or to department of interest.

FIELDS OF STUDY FOR THE PH.D.

Chemical Engineering Transfer processes, combustion, thermodynamics, catalysis Prerequisites equivalent of undergraduate curriculum in chemical engineering, must be in upper 20 per cent of graduating class. Combined program with metallurgical engineering. Faculty 6 full time, 8 part time. 46 graduate students enrolled.

Chemistry Physical and theoretical, organic, inorganic, nuclear Prerequisites four year course in chemistry, two years of foreign language. Faculty 14 full time, 100 graduate students enrolled.

Civil Engineering Structural engineering, hydraulic engineering, applied mechanics Prerequisites four year undergraduate program in civil engineering, good academic record, high recommendations from professors Faculty 7 full time, 5 part time. 37 graduate students enrolled.

Electrical Engineering All phases of this field. Prerequisites four year undergraduate program in electrical engineering, B plus average or better Faculty 16 full time, 56 graduate students enrolled

Mathematics Calculus of variations, ordinary differential equations, partial differential equations, diffusion theory, convex bodies, rational mechanism, elasticity, conformal mapping, abstract analysis, game theory, quality control. Prerequisites B.S. in mathematics, high quality undergraduate work in mathematics Recommended courses in physics particularly mechanics, German, French, and, when possible, Russian. Combined program with Department of Physics, Graduate School of Industrial Administration, and occasionally others Faculty 23 full time. 33 graduate students enrolled.

Mechanical Engineering Hydrodynamic theory of lubrication, turbulent mixing of fluids, friction and wear Prerequisites B.S. and M.S., exceedingly high recommendations. Combined program with metallurgical engineering. Faculty 16 full time, 3 part time. 91 graduate students enrolled.

Metallurgical Engineering All branches of physical and chemical metallurgy Prerequisites equivalent to Carnegie's undergraduate program in metallurgical engineering, though allowances are made for other training Combined programs

biochemistry Prerequisites fundamental under graduate courses in general, organic, analytical and physical chemistry, physics and mathematics including integral calculus Reading knowledge of German is extremely desirable Orienting examination required of all new students Faculty 8 full time, 56 graduate students enrolled.

Economics Economic theory, economic history, finance, labor and industrial relations statistics, Catholic economic thought. Prerequisites 24 semester hours in social sciences 15 in economics Faculty 7 full time, 1 part time 35 graduate students enrolled

Education Fundamentals of education history of education, higher secondary and elemental education, administration, educational psychology guidance, education of the exceptional child Prerequisites 12 semester hours of education (or qualifying examination) Faculty 10 full time, 14 part time 174 graduate students enrolled.

English Prerequisites adequate knowledge and ability to write English effectively (qualifying examination offered on option of Department) Candidates must study Old and Middle English and be able to pass Latin test. Faculty 10 full time, 1 part time. 77 graduate students enrolled

German and Comparative Philology and Celtic German language and literature Prerequisites undergraduate major in German, advanced composition and conversation, or its equivalent Minors are taken in related fields of study Faculty 3 full time 10 graduate students enrolled

Greek and Latin If Greek is major Latin is minor and vice versa ancient history or comparative philology is second required minor subject. Prerequisites Latin major in college, reading knowledge of French or German Qualifying examination at beginning of first semester Knowledge of both is desirable from the beginning of study Faculty 8 full time 22 graduate students enrolled

History Student not permitted to confine study to a single field of history Student should have skill in using any language essential for his research. Faculty 12 full time. 63 graduate students enrolled.

Mathematics Prerequisites mathematics through differential calculus Higher algebra and advanced calculus may be taken after graduate work is begun. Reading knowledge of German or French is highly desirable Faculty 9 full time

1 part time. 32 graduate students enrolled

Music Musicology Major field must be chosen from music history, theory, or education First minor must be done outside the field of music. Faculty 10 full time, 1 part time 99 graduate students enrolled

Philosophy Scholastic philosophy in the Middle Ages, contemporary scholasticism Prerequisites complete undergraduate course in philosophy, mathematics, physics chemistry, and biology, B.A. or Ph.B., Latin, French, German, recommendations as to character and health Knowledge of Greek is desirable Faculty 11 full time 45 graduate students enrolled.

Physics Prerequisites see catalog for undergraduate physics courses, general chemistry, differential and integral calculus, written examination in elementary physics. Faculty 8 full time, 2 part time, 94 graduate students enrolled.

Politics Political theory, government, international law and relations Prerequisites 21 semester hours in social sciences, 12 in political science Faculty 4 full time, 1 part time 15 graduate students enrolled

Psychology and Psychiatry Prerequisites general psychology, experimental psychology, and statistics, two semesters each of philosophy, biology, mathematics, physics and calculus, and one semester of physiology Qualifying examination given to all applicants M.D. required for major in psychiatry Faculty 16 full time, 6 part time 38 graduate students enrolled.

Religious Education Prerequisites preparation in religion, 12 semester hours of philosophy, ethics education, or the social sciences Student must be thoroughly grounded in the basic doctrinal, liturgical, moral, and scriptural fundamentals of Catholicism. Faculty 6 full time, 17 graduate students enrolled.

Romance Languages Prerequisites general survey of literature, undergraduate advanced language course, 21 semester hours of credit in the language selected as a major Faculty 6 full time 45 graduate students enrolled

Semitic Languages Arabic, Coptic, Hebrew, and Syriac. Prerequisites adequate knowledge of Greek and Latin, reading knowledge of French and German. Faculty 5 full time. 3 graduate students enrolled

Sociology History and methods of sociology, marriage and family relationships social organization, social problems and trends, Catholic so-

cial thought Prerequisites 24 semester hours in social sciences, 12 in sociology, courses in ethics and statistics Faculty 6 full time 45 graduate students enrolled

The University of Chicago

CHICAGO ILLINOIS

Graduate Programs

Graduate degrees have been awarded since the establishment of the University in 1892 Since 1931 work at the graduate level has been done in four divisions and six professional schools 222 Ph D s awarded in 1956 7

Four of the six schools offer the Ph D School of Business, School of Social Service Administration, Graduate Library School, Divinity School (which is a part of the Federation of Theological Schools) The School of Law offers the D Comp L, the School of Medicine (Division of the Biological Sciences), the M D

Several hospitals and clinics, cancer research laboratory, Food Research Institute Institute of Meat Packing Oriental Institute, observatories at Williams Bay Wisconsin, and Fort Davis, Texas, map library, Institute for the Study of Metals, Fermi Institute for Nuclear Studies 450 Mev synchrocyclotron, low temperature laboratory, affiliation with Argonne National Laboratory Economics Research Center, Midwest Administration Center (education), Population Research and Training Center, Chicago Community Inventory, National Opinion Research Center, orthogenic school, centers for counseling, family study, and industrial relations

Dormitories for graduate men and women Summer and limited number of evening courses

Residence requirement for doctorate a minimum of three quarters of residence in a full program of study at the University

ADMISSION REQUIREMENTS

Bachelors degree undergraduate record of good quality, recommendations from two college faculty members acquainted with character and ability Students over 25 years of age without two years of college, may apply for accelerated program leading to A B, S M, or A M. degrees

and take a general education test

Apply to Office of Admissions, Administration Building Room 203, generally six months before quarter in which student wishes to enter Professional schools may ask for direct application

FEES AND FIRST YEAR AID

Tuition—\$840 a year, fees—\$60 Room—\$80 to \$115 per quarter for men, \$92 50 to \$112 50 for women. Board—approximately \$150 a quarter

Fellowships, scholarships, assistantships, loan funds, and employment opportunities are available Apply to Committee on Fellowships and Scholarships, Administration Building, Room 304, on or before February 15

Division of the Biological Sciences

FIELDS OF STUDY FOR THE PH D

Anatomy Histology, histochemistry cytology, neurology, gross anatomy, radiobiology M D also awarded in this field Faculty 6 full time 7 graduate students enrolled.

Biochemistry Biochemistry for medical, research, or teaching careers Not prerequisites but advised 3 courses in physics, mathematics through calculus, 10 courses in chemistry, courses in histology, bacteriology, comparative anatomy of vertebrates M D also awarded in this field Faculty 14 full time 38 graduate students enrolled

Biophysics Curriculum is designed to train students to investigate and teach biological subjects with the techniques and from points of view of both physical and biological sciences Prerequisite training equivalent to that required for an S B in physics at this University Faculty 5 full time 2 graduate students enrolled

Biopsychology Understanding the role of neural and extra neural aspects of the internal environment in the regulation of behavior This is a section of the Department of Psychology, requirements for which are listed under the Division of Social Sciences Faculty 8 full time 7 graduate students enrolled

Botany Morphology, cytology, physiology, ecology, pathology, mycology Faculty 9 full time 7 graduate students enrolled

Mathematical Biology Faculty 2 full time 5 graduate students enrolled

Medicine General medicine dermatology, neurology M.D. is prerequisite for Ph.D. except in the field of medical chemistry M.D. also awarded in this field Faculty 48 full time

Microbiology General microbiology and microbial physiology, medical bacteriology, parasitology virology, immunology Prerequisite program of work required for the S.M. in microbiology, or its equivalent M.D. also awarded in this field Faculty 13 full time, 1 part time 29 graduate students enrolled

Obstetrics and Gynecology Students are not advised to seek a higher degree unless they have proved their fitness to develop as specialists M.D. also awarded in this field Faculty 13 full time

Pathology M.D. also awarded in this field. Faculty 9 full time 2 graduate students enrolled

Pediatrics General pediatrics preventive pediatrics contagious diseases Higher degree is not recommended unless candidate has proved his fitness to develop as a specialist in this field M.D. also awarded in this field Faculty 13 full time

Pharmacology Pharmacology and toxicology M.D. also awarded in this field Faculty 4 full time 4 part time 16 graduate students enrolled

Physiology Prerequisites evidence of aptitude (professional aptitude tests or University of Chicago entrance aptitude tests), test on general education (GRE or equivalent may be accepted) M.D. also awarded in this field Faculty 8 full time 3 part time

Surgery Ph.D. is recommended only for students who have completed the work required for the M.D. M.D. also awarded in this field Faculty 34 full time

Zoology Faculty 7 full time, 2 part time. 27 graduate students enrolled There is also an interdivisional program in paleozoology for which the requirements are completion of the S.B. at the University (or its equivalent), 1 year of college chemistry, 1 of college physics and 1 of college mathematics, including college algebra trigonometry, and analytical geometry

Division of the Humanities

This division prepares students for teaching, research and general understanding and appreciation of humanistic studies

All students must have had a satisfactory training in at least two languages, although the deficiency may be made up within the first three quarters of residence German and French will be needed for the Ph.D.

FIELDS OF STUDY FOR THE PH.D.

Analysis of Ideas and Study of Methods Philosophic issues in the history of conflicts and discussions in the various fields and in the history of methods such as those of grammar, rhetoric, poetic, logic, and scientific methods Faculty 10 Divisional faculty members participate 9 graduate students enrolled

Art History and teaching of art. Faculty 14 full time 36 graduate students enrolled

Classical Languages and Literatures Ancient civilizations of Greece and Rome and their impact on Western culture. Faculty 9 full time 21 graduate students enrolled

Comparative Studies in Literature An interdepartmental program involving relations between literatures in different languages within the Division of Humanities Students must have adequate training in languages, in methods and techniques of literary history, and in methods of analysis and criticism Student must submit a proposed program of study and a petition to be allowed to follow this program in work toward a Ph.D. He must have an average grade equivalent to B in courses and/or examinations taken during the last two years of study Recommended master's degree taken in one of the departments Faculty 7 full time 24 graduate students enrolled.

English Language and Literature English and American literature Faculty 20 full time, 1 part time 122 graduate students enrolled.

Germanic Languages and Literatures German and Scandinavian Faculty 11 full time 22 graduate students enrolled

History of Culture Culture of various geographic areas and historical periods involving either ideas and movement which coexisted in a period or area, or theories and methods applied in different areas or periods This is an interdepartmental program involving literature, art, philosophy science, religion and politics, and society Prerequisites reading knowledge of French or German and any other foreign language necessary to field of specialization or willingness to acquire such knowledge without delay, GPA of

B or better in courses and/or examinations taken during the last two years of previous study, suitability of the chosen field and adequacy of the proposed program Faculty 10 members of the Divisional staff 7 graduate students enrolled

Linguistics Indo European, Indic philology, Slavic languages and literatures Students who do not have an A.M. in linguistics from this University will be required to give evidence that they have done equivalent work Faculty 8 full time 8 graduate students enrolled

Music Composition, critical analysis, history and meaning of music, biographical skills necessary for investigation of musical problems Admission and placement examination required, also a demonstration of competence to work with independence and originality in music, through an interview with a member of the Department or on the basis of evidence (such as essays) previously submitted Faculty 4 full time 9 graduate students enrolled

New Testament and Early Christian Literature History, interpretation language literature Faculty 4 full time members of the Divinity School 10 graduate students enrolled

Oriental Languages and Literatures Ancient civilizations of Egypt, Western Asia, Judaism, Islam, India, and China Faculty 21 full time, 2 part time 21 graduate students enrolled

Philosophy Understanding and critical examination of the principles, ideals and systems of ideas basic to science, social institutions, and literature and the arts Program presupposes broad training in science, social science and the humanities Faculty 8 full time, 8 part time 52 graduate students enrolled

Romance Languages and Literatures Reading, speaking and writing of French, Spanish, and Italian, literary history, analysis of artistic and intellectual values of the literature in these languages, Romance linguistics, methods of teaching and research in these fields Students entering from another institution must take placement examination in written and oral use of principal Romance language and analysis of texts Faculty 10 full time 29 graduate students enrolled

Division of the Physical Sciences

A reading knowledge of two foreign languages (designated by the department) is re-

quired for the degree, but not for admission

FIELDS OF STUDY FOR THE PH.D.

Astronomy and Astrophysics Faculty 11 full time 7 graduate students enrolled

Chemistry Analytical, inorganic, organic, or physical chemistry, geochemistry or chemical physics Student must pass reading examinations in German and in French or Russian before he can file for admission to candidacy Faculty 25 full time, 2 part time 126 graduate students enrolled

Geography Faculty 5 full time, 6 part time 9 graduate students enrolled, 17 additional students in the Division of the Social Sciences

Geology Prerequisites background in physical science equivalent to the course work in Natural Sciences I given in the College, an elementary knowledge of differential calculus Faculty 12 full time, 2 part time 37 graduate students enrolled

Mathematics Requirements (1) A reading knowledge of German and French or Italian or Russian, (2) to pass written examination for the S.M. degree, (3) to pass an oral qualifying examination Faculty 22 full time 85 graduate students enrolled

Meteorology Requirement a reading knowledge of German and French or Russian Major objectives of the department are training in the meteorological sciences, research on problems of the atmosphere. Faculty 11 full time, 16 graduate students enrolled

Physics Prerequisites adequate background, with a sound training in advanced mathematical methods and physics as represented by the conventional bachelor's degree with a major in physics Recommended graduates of other institutions should submit results of GRE Advanced Physics and Aptitude Tests Faculty 31 full time 142 graduate students enrolled

Statistics Research in theory and application of statistics with provision for study, library work, seminars and lectures by visiting statisticians Most activity in statistics constitutes a branch of applied mathematics dealing with specific techniques for the analysis of quantitative data Prerequisite some study of a field to which statistics can be applied or advanced mathematics Faculty 11 full time, 1 part time 14 graduate students enrolled

Division of the Social Sciences

FIELDS OF STUDY FOR THE PH.D.

Anthropology Ethnology, social anthropology, archaeology, linguistics, and physical anthropology Reading knowledge of French or German should be established before taking master's Faculty 11 full time, 5 part time 82 graduate students enrolled

Economics Price theory, monetary theory and banking, statistics, mathematical economics and econometrics, economic history, labor economics and industrial relations, agricultural economics, government finance, international economic relations economics of consumption Recommended rudiments of differential calculus as preparation for economic research Faculty 27 full time 75 graduate students enrolled.

Education Preschool and elementary, secondary, general, higher, and adult education, school and social order, quantitative inquiry, educational administration and supervision, philosophy of education, educational psychology, curriculum and methods Faculty 35 full time, 5 part time 181 graduate students enrolled

History Main aspects of the rise and development of civilizations in fields of ancient Oriental, Greek, Roman, European, Far Eastern, and American history Students with only an A.B. must submit a report or paper showing ability to do independent research, but only after three or four quarters of work in the Division Faculty 23 full time 79 graduate students enrolled

Human Development Research in human behavior psychological development of the individual, social organizations which influence the individual and through which he relates to others, biological bases of behavior Prerequisites fundamental knowledge in the three areas mentioned above Faculty 13 full time. 81 graduate students enrolled

Nursing Education No Ph.D., but nurses can earn doctorates by electing another field of work, such as education or sociology

Political Science Prerequisite master's degree in the Department or by transfer from another university with the master's. Available evidence must suggest that student has potentialities for successful work at Ph.D. level. Faculty 16 full time, 4 part time. 103 graduate students enrolled.

Psychology Prerequisites three basic courses

in psychology, one in introductory statistics, at least two courses in college level mathematics. Application for admission should be made at least six months before opening of quarter in which student wishes to enter Students must have recommendation of Departmental Admission Committee, usually upon completion of A.B. or B.S. courses, or equivalent. Recommended preparation in analytic geometry and calculus Faculty 20 full time 69 graduate students enrolled

Social Thought Ideas concerning the intellectual and moral foundations of society, concepts and hypotheses interpretive of historical change, and the interaction of society, ethics, and culture An example of the student's best writing must accompany application, or he may be asked to write a brief essay on a suggested problem if evidence submitted seems inadequate Student should address a letter to the Executive Secretary of the Committee on Social Thought giving reasons for wishing to study in this field and including a statement of type of work he intends to pursue, preliminary sketch of work, and a statement of previous educational work. The faculty is made up of members of other departments 11 graduate students enrolled

Sociology Theory and method, social psychology and communication, urbanism, population, and human ecology, social organization. Admission is usually granted only to students with an A.M. Applicant with degree from another department or university must submit copy of the thesis with application for admission. If applicant has not written a thesis, but can submit evidence of equivalent research, M.A. requirement may be waived Certain preparatory courses must be taken if student's background is considered inadequate Communicate directly with the department for admission. Faculty 15 full time, 10 part time 80 graduate students enrolled

PROFESSIONAL SCHOOLS

School of Business

Work required for the M.B.A. at the University, or equivalent education, is a prerequisite for admission to study for the Ph.D. Students with less background will be permitted to enroll but must complete appropriate work in the M.B.A. program

Student must make a successful score on the Admission Test for Graduate Study in Business Faculty 42 full time 211 graduate students enrolled

School of Social Service Administration

A prerequisite to admission for study leading to a Ph D is a master's degree with a distinguished record from an accredited school of social work and experience which demonstrates professional competence and indicates leadership qualities—three to five years in the field usually establishes the latter Faculty 32 full time, 8 part time 139 graduate students enrolled

Graduate Library School

A prerequisite for admission for students desiring the Ph D is the successful completion of courses required for the master's degree or equivalent education Students who have not taken the GRE are required to take a general education examination Area Tests results of GRE may be submitted Formal application must be made to the School through personal interview or correspondence at least six weeks in advance of the beginning of the quarter in which admission is sought Faculty 12 full time 48 graduate students enrolled

Divinity School

Prerequisite for admission of students intending to work for the Ph D AB with a satisfactory record Entrance tests or GRE required If student does not have an AB or comes from a non accredited school he must take the General Education Tests also

The four theological seminaries (one of which is the Divinity School) in the Federation require information about student's character, motivation scholastic ability and health This information is to be submitted on application form Faculty 38 full time staff members of the Federated Theological faculty 315 graduate students enrolled

NOTES

Departments share in the education of teach

ers and the preparation of prospective teachers Council on Teacher Education formulates the general policy for these varied departmental programs In three divisions (Biological, Physical, and Social Sciences), committees on preparation of teachers help faculties translate general policies into practice with the departmental and interdepartmental program of study For specialized training in curriculum, methods, guidance etc students enroll in the Department of Education

University of Cincinnati

CINCINNATI, OHIO

Graduate School of Arts and Sciences

Established as an individual unit of the University with faculty and dean in 1906 graduate instruction, however, offered as early as 1877 Ph D was first conferred in 1892 Co educational Control vested in Dean and the Graduate Council composed of members of Graduate Faculty elected by the faculty

Summer and evening courses 20 Ph D's awarded in 1936 7

For doctorate last year of three years of full time or equivalent study must be in full time residence at this University

Medical College awards M D, Teachers College, Ed D

Resident halls for men and women. Particularly fine library of works in modern Greek, the classics, mathematics Observatory, research laboratory of Tanners Council of America

ADMISSION REQUIREMENTS

Bachelor's degree plus appropriate preparation in field of major study Scholastic rating must be satisfactory to department of major field Some departments require GRE or MAT Recommended GRE

Apply to Dean of the Graduate School before June 1 on forms obtained from Graduate School

FEES AND FIRST YEAR AID

Tuition—In city \$330 full time, plus \$20 general fee, part time (less than 12 credit hours)

FIELDS OF STUDY FOR THE PH.D.

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Divinity School

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University of Cincinnati

CINCINNATI, OHIO

Graduate School of Arts and Sciences

Established as an individual unit of the University with faculty and dean in 1906, graduate instruction, however, offered as early as 1877. Ph.D. was first conferred in 1892. Co-educational. Control vested in Dean and the Graduate Council, composed of members of Graduate Faculty elected by the faculty.

Summer and evening courses 20 Ph.D.s awarded in 1936-7.

For doctorate last year of three years of full time or equivalent study must be in full time residence at this University.

Medical College awards M.D., Teachers College Ed.D.

Resident halls for men and women. Particularly fine library of works in modern Greek, the classics, mathematics. Observatory, research laboratory of Tanners Council of America.

ADMISSION REQUIREMENTS

Bachelor's degree plus appropriate preparation in field of major study. Scholastic rating must be satisfactory to department of major field. Some departments require GRE or MAT. Recommended: GRE.

Apply to Dean of the Graduate School before June 1 on forms obtained from Graduate School.

FEES AND FIRST YEAR AID

Tuition—In city \$330 full time, plus \$20 general fee, part time (less than 12 credit hours)

\$12 per credit hour per semester, plus \$5 annual registration fee, out of city \$465 full time, plus \$20 general fee and \$20 medical fee, part time \$16 per credit hour per semester, plus \$5 annually Room—men \$6.50 per week, women \$6.48 per week Board—\$9 per week and up, two meals daily

Graduate assistantships in many departments paying up to \$1,600, plus remission of tuition. Limited number of fellowships available to first year students. Stipends \$500-\$3,000 per year.

Apply before March 1 to Graduate School Office for fellowships, departments for assistantships.

FIELDS OF STUDY FOR THE PH.D.

Anatomy Cancer, endocrinology, hematology, radiation biology, electroencephalography, teratology, gross anatomy, microscopic anatomy and neuroanatomy. Prerequisites: general zoology, embryology, comparative anatomy, general chemistry, organic chemistry, physics. 6 semester hours of English, GRE or Medical Admission Test, bachelor's degree. Faculty: 6 full time, 3 part time. 5 graduate students enrolled.

Applied Science Research on materials in the solid state, liquid, vapor, and gaseous states, instrumentation, chemical physics, chemistry and physics of surfaces, material erosion, deterioration of materials under military conditions, research in synthetic organic chemistry and reaction kinetics. Prerequisites: degree in any branch of engineering, chemistry or physics, course in differential equations, course in electrical measurements, high scholastic standing, recommendations from 5 persons familiar with work and ability, 2 recommendations for character and personality. Faculty: 4 full time, 1 part time. 19 graduate students enrolled.

Biological Chemistry Prerequisites: general chemistry, qualitative analysis, quantitative analysis, organic chemistry, physical chemistry and physics, undergraduate major in chemistry with an average grade of B. is required of candidates for degrees. GRE may be required. Faculty: 5 full time, 2 part time. 2 graduate students enrolled.

Botany and Bacteriology Bacteriology, mycology, bryophytes (especially hepaticae) in any phase, taxonomy and anatomy of woods, palaeobotany. Prerequisites: bachelor's degree with some of the following courses: taxonomy of non-

vascular and vascular plants, plant physiology, plant morphology, mycology, bacteriology, chemistry, geology, zoology. Faculty: 3 full time, 6 graduate students enrolled.

Chemical and Metallurgical Engineering Prerequisites: bachelor's degree in chemical engineering or equivalent, bachelor's degree in closely related fields (chemistry, metallurgy) will be accepted, with undergraduate work required to make up deficiencies, bachelor's degree in metallurgy, metal engineering or equivalent, bachelor's degree in closely related fields (mechanical engineering, chemical engineering) will be accepted with undergraduate work required to make up deficiencies, good undergraduate record and recommendations from former professors. Faculty: 10 full time, 3 part time. 17 graduate students enrolled.

Chemistry Organic, inorganic, physical, analytical, and theoretical chemistry. Prerequisites: general chemistry, 1 year analytical, 1 year organic, 1 year physical chemistry, mathematics through calculus. (Deficiencies in any of these must be made up in first year.) Faculty: 9 full time, 2 part time. 37 graduate students enrolled.

Classics Greek, Latin, ancient history, archaeology. Prerequisites: a working knowledge of Greek and Latin. Faculty: 6 full time. 12 graduate students enrolled.

Economics Economic theory, international economics, labor. Prerequisites: year course in principles of economics, money and banking, and any two other economics courses. Faculty: 4 full time. 15 graduate students enrolled.

English Concentration in all important periods and topics of English American literary and theatrical history. Prerequisites: undergraduate study in English approximately equivalent to that for majors in English who graduate with the B.S. from the College of Arts and Sciences, University of Cincinnati. Written preliminary examination is required before formal candidacy is recognized in the case of students who have not graduated as majors in English from this University. Faculty: 7 full time. 29 graduate students enrolled.

Geology Petrology, palaeontology, stratigraphy, glacial geology, structural geology, sedimentology. Prerequisites: one year each of calculus, chemistry, and physics, or biology, plus undergraduate major in geology. Faculty: 7 full time. 20 graduate students enrolled.

German Germanic philology, German literature from the earliest times to the 20th century Prerequisites courses in the classical period of German literature, survey course in the history of German literature from 800 A.D. forward at least 18 credits in German beyond the elementary stage Faculty 3 full time 9 graduate students enrolled

Internal Medicine Hematology and nutrition, infectious diseases, metabolism and endocrinology, gastroenterology, cardiology Prerequisites M.D. from Grade A medical school, one year of approved internship, interview and acceptance by head of the division in which studies are to be carried out. Recommended 1 or 2 years of assistant residency in internal medicine Faculty 22 full time, 18 part time

Mathematics Algebra, analysis geometry, applied mathematics and mechanics logic and foundations Prerequisites strong undergraduate major in mathematics Faculty 10 full time 41 graduate students enrolled

Microbiology Medical microbiology with special emphasis on host-parasite relationships, bacterial nutrition and metabolism, immunology, cytology Faculty 3 full time, 1 part time 3 graduate students enrolled

Pathology Experimental and comparative pathology Prerequisites gross and microscopic anatomy, comparative anatomy Recommended qualitative and quantitative analytic chemistry, organic chemistry, physiology embryology Faculty 6 full time

Pharmacology Pharmacology of nerve and muscle, autonomic nervous system, heart and circulation, ion transport, and drug metabolism. Prerequisites college zoology physics, inorganic chemistry, organic chemistry Faculty 4 full time, 1 part time 3 graduate students enrolled

Philosophy History of philosophy, logic, semantics, ethics aesthetics, philosophy of religion Prerequisites 3 written three hour examinations for admission to candidacy for M.A. degree Faculty 4 full time 7 graduate students enrolled

Physics Theoretical and solid state physics, X rays and related subjects dynamics, biophysics Prerequisites preferably a major in physics mathematics, engineering, or chemistry Faculty 11 full time, 3 part time 24 graduate students enrolled

Physiology Prerequisites major (undergraduate) in biology or chemistry, premedical course

acceptable, interview with chairman and members of the department. Faculty 4 full time, 3 part time 4 graduate students enrolled.

Political Science Public law, comparative government, public administration, international organization and politics Prerequisites American government or its equivalent Faculty 9 full time 6 graduate students enrolled

Psychology Counseling, theoretical experimental Prerequisites experimental, abnormal, and systematic psychology, elementary psychometrics, personality theory, 20 hours of undergraduate work in psychology with grade average not less than "A—" Faculty 7 full time 16 graduate students enrolled

Romance Languages French Renaissance to contemporary literature and philology, Spanish XIX and contemporary literature, philology Spanish American literature Prerequisites Latin Faculty 8 full time 8 graduate students enrolled

Tanning Research Basic sciences of tanning research, chemistry, biophysics, biology, microbiology Prerequisites major in chemical engineering or chemistry, good undergraduate record and interest in field Faculty 6 full time, 4 part time 4 graduate students enrolled

Zoology Ecology, endocrinology, herpetology, mammalogy, parasitology, and physiological aspects of genetic biology Prerequisites training in chemistry and physics, undergraduate major in zoology or the equivalent, GRE, grade average of at least B in undergraduate work. Faculty 6 full time 13 graduate students enrolled.

Claremont College

CLAREMONT, CALIFORNIA

Claremont Graduate School

Claremont College was established in 1925 as the central coordinating institution and Graduate School for the Associated Colleges at Claremont. The major purpose of the Graduate School is to offer advanced instruction, especially in the humanities social sciences, and education, leading to the M.A., M.F.A., and Ph.D. degrees, thus preparing its students for careers in teaching and research.

Affiliation of the Rancho Santa Ana Botanic Garden provides excellent facilities for graduate study and research in botany and horticulture. The Intercollegiate Program of Graduate Studies offers cross-disciplinary seminars and colloquia of special value to doctoral students in economics. English and American literature government and history. There is a new residence building for single and married students.

Coeeducational. Privately supported. Summer and evening courses. 5 Ph.D.s awarded in 1956-7.

Residence requirements for doctorate minimum of three full years beyond the baccalaureate degree, two of which must be completed at Claremont. Not less than two academic years of full-time study or their equivalent must be completed prior to taking qualifying examinations at least one of which must be completed at Claremont.

ADMISSION REQUIREMENTS

B.A. or its equivalent, conferred by an institution of recognized academic standing, an undergraduate record satisfactory in terms of quality of scholarship and background in the liberal arts and sciences, satisfactory preparation in major field, approval of faculty committee in major field.

Normally a reading knowledge of French and German, but another language may be substituted if program requires.

Recommended GRE and MAT

Apply to Admissions Secretary at least one month prior to opening of any semester.

FEES AND FIRST YEAR AID

Tuition—\$300 per semester. Room—\$185 per semester. Furnished apartments for married students \$55-\$60 per month.

More than 20 scholarships ranging from \$600 to \$1,500. Apply to Admissions Secretary on or before March 15.

FIELDS OF STUDY FOR THE PH.D.

Botany Taxonomy morphology genetics, mycology ecology anatomy. Prerequisites: fundamental courses in botany plus general genetics, general chemistry, general zoology, general geology, a basic course in physics, college algebra, reading knowledge of German and another language appropriate to area of concentration. Faculty 7 full-time, 10 graduate students enrolled.

Faculty 7 full-time, 10 graduate students enrolled.

Economics Economic theory, industrial organization and public policy, finance, labor, international economics, statistics, economic development (South Asia). Program combined with government. Prerequisites: minimum of 24 semester units in economics, normally including accounting, statistics, money and banking, and intermediate economic theory, advanced statistics and mathematics may be substituted for one language. Recommended GRE in economics. Faculty 14 full-time, 3 part-time, 12 graduate students enrolled.

Education Social foundations of education, psychological foundations of education, curriculum and instruction, administration and supervision, elementary and secondary education. Counseling and guidance included in psychological foundations of education. Programs combined with psychology. Prerequisites: satisfactory score on MAT, satisfactory professional promise. Recommended: two years teaching a master's degree, statistics and research design. Faculty 9 full-time, 9 part-time, 40 graduate students enrolled.

English and American Literature English Renaissance, 18th and 19th century English, 19th and 20th century American. Prerequisites: normally an undergraduate major in English, two languages—normally Latin, French, or German. Faculty 18 full-time, 1 part-time, 22 graduate students enrolled.

Government Political theory, public administration, including comparative, public law, international relations, comparative government, politics and legislation, political development (South Asia). Combined programs with history and economics. Prerequisites: minimum of 24 semester units in government, normally including courses in American and comparative government, administration, political theory, and public law, elementary statistics. Faculty 7 full-time, 2 part-time, 9 graduate students enrolled.

History American political, intellectual, and diplomatic, British, Latin American, Eastern Asia. Combined program with government. Prerequisites: normally an undergraduate major in history. Faculty 10 full-time, 2 part-time, 22 graduate students enrolled.

Psychology General experimental with emphasis on personality, social, learning, child. Combined programs with education—psychology.

ical foundations of education, with government—social analysis of institutional processes. Pre-requisites: experimental, statistics, abnormal, child, physiological, French and German, but advanced knowledge of statistics and mathematics may be substituted for one. MAT, entrance examination. Recommended electives to make three full years of graduate study. Faculty 7 full time, 2 part time. 22 graduate students enrolled.

Clark University

WORCESTER, MASSACHUSETTS

Graduate School

Clark University was chartered in 1887 as one of America's first institutions dedicated exclusively to graduate study and research. Although an undergraduate college was established in 1902, the University continued to emphasize graduate education for both men and women.

Summer and evening courses. 18 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: at least one year beyond the M.A.

ADMISSION REQUIREMENTS

Bachelor's degree with high scholastic standing.

Recommended: GRE.

Apply at any time but preferably between January 1 and March 1, to the Chairman of the Department.

FEES AND FIRST YEAR AID

Tuition—\$700. Board—\$380.

Scholarships from \$700 to \$1,200 available as well as loan funds. Apply before March 1 to the Chairman of the Department. Teaching assistantships also available.

FIELDS OF STUDY FOR THE PH.D.

Chemistry. Physical and organic, radiochemistry. Prerequisites: fundamental courses of college grade, including general, organic, and inorganic chemistry. Faculty 4 full time, 2 part time. 22 graduate students enrolled.

Economics and Sociology. Combined program with international relations. Prerequisites: at

least four courses including introductory economics. Faculty 6 full time, 1 part time. 15 graduate students enrolled.

Geography. Economic, political, urban, agricultural, and physiological. Combined program with international relations. Faculty 6 full time, 1 part time. 24 graduate students enrolled.

History. Government and international relations, American, European, and British history. International relations program includes economics and geography. Recommended: GRE. Faculty 5 full time, 1 part time. 18 graduate students enrolled.

Psychology. Clinical, experimental and genetic. Prerequisite: GRE. Faculty 7 full time, 9 part time. 42 graduate students enrolled.

Colorado State University

FORT COLLINS, COLORADO

The Graduate School

Graduate study is an integral part of the University. It is taught by distinguished members of the faculty who are given separate appointments to the graduate faculty. The master's degree has been awarded for many years. The first doctor's degree was awarded in 1955. The Dean administers the school in conjunction with the Graduate Council, members of which are elected by the graduate faculty of the various colleges. (All graduate degrees are offered by the Graduate School.)

State agricultural experiment station, Colorado State University Research Foundation, irrigation and hydraulics laboratories, veterinary medicine hospital, plant herbarium, nuclear reactor.

Accommodations available in dormitories and off campus for graduate students in both regular term and summer sessions. Men and women. 3 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: at least five quarters must be earned in residence at the University.

ADMISSION REQUIREMENTS

Bachelor's degree with high scholastic average. A minimum of a B average for the senior

year Apply to the Dean of the Graduate School at least one month prior to the beginning of the quarter in which the student plans to register

FEES AND FIRST YEAR AID

Tuition and fees—\$210.00 per academic year, \$510 for non residents of Colorado Room and board—minimum \$70.00 per month

Graduate scholarships which provide for tuition only are available Graduate research and teaching assistantships are offered to qualified students Application by May 1 to the head of the department in which the student plans to study

FIELDS OF STUDY FOR THE PH.D.

- Animal Pathology* Faculty 5
- Bacteriology* Faculty 3 1 graduate student enrolled
- Biochemistry* Faculty 4 2 graduate students enrolled
- Chemistry* Faculty 7 1 graduate student enrolled
- Civil Engineering* Faculty 6 2 graduate students enrolled
- Genetics* Faculty 8
- Irrigation Engineering* Faculty 10 8 graduate students enrolled
- Physics* Faculty 5 3 graduate students enrolled
- Zoology* Faculty 6 4 graduate students enrolled

University of Colorado

BOULDER, COLORADO

The Graduate School

Graduate work began on a small scale in 1892 The present school was organized in 1909 with a separate faculty The Dean administers the school in conjunction with an executive committee appointed by the President of the University

Museum, archeological material, fine arts gallery, medical center for the School of Medicine, including mental hospital, engineering experiment station, Institute of Arctic and Alpine

Research with laboratory at 12,200 feet and lodge at 9,500, high altitude observatory

Affiliation with Los Alamos Scientific Laboratory

Campus is 27 miles from Denver, at 5,354 feet Accommodations on campus during summer for graduate students

Men and women Summer and evening courses 38 Ph.D.s awarded in 1956-7

Residence requirement for doctorate at least four semesters (six quarters) residence credit must be earned at the University, two or more spent consecutively in one academic year

ADMISSION REQUIREMENTS

Bachelor's degree Departments set various standards

Apply to Admissions Office at least one month prior to the opening of the semester or quarter in which the student plans to register

FEES AND FIRST YEAR AID

Tuition—in state \$212 per academic year for full schedule, \$578 for out-of state Room—\$180-\$450 per year

Graduate scholarships are available which provide for tuition only, University fellowships, providing for tuition and a stipend of \$600-\$1,800 for the nine month academic year, are open to highly qualified first year students Apply by March 1 to the Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Aeronautical Engineering Prerequisites a bachelor's degree in a curriculum which includes the necessary prerequisites for this branch of engineering (equivalent to the B.S. in Aero. E. at this University) Faculty 4 full time 10 graduate students enrolled

Anatomy Prerequisites courses equivalent to an undergraduate major in zoology or biology Faculty 4 full time 8 graduate students enrolled

Anthropology Prerequisites 16 semester hours of undergraduate work in anthropology, or 12 hours of anthropology and 8 semester hours in sociology, principles of anthropology Faculty 3 full time 6 graduate students enrolled

Astro Geophysics Seismology astronomy, solar research. Prerequisites a thorough undergraduate preparation in physics and mathematics, including mechanics, electricity, atomic physics, and mathematics through differential

equations Recommended elementary knowledge of geology and astronomy Faculty 5 full time 2 graduate students enrolled

Biochemistry Prerequisites courses required for an undergraduate major in chemistry Faculty 7 full time 1 graduate student enrolled

Biology Botany, zoology The student is expected to have attained distinction in previous biological study and have demonstrated ability to carry on independent research. Faculty 15 full time 29 graduate students enrolled

Biophysics Faculty 6 full time 1 graduate student enrolled

Chemical Engineering Prerequisites courses equivalent to work required at this University for the BS in Chem. Eng. Faculty 4 full time 11 graduate students enrolled

Chemistry Organic, inorganic, physical, and sanitary chemistry, radiochemistry (electrochemistry), biochemistry Prerequisites general, analytical, organic, and physical chemistry, college physics, mathematics through calculus Faculty 13 full time 66 graduate students enrolled

Civil Engineering Prerequisites courses equivalent to work required at this University for the BS in civil engineering Faculty 11 full time, 2 part time 54 graduate students enrolled

Economics Prerequisites sixteen hours of undergraduate work in economics, including an adequate course in principles Faculty 9 full time 20 graduate students enrolled

Education Teaching, administration, guidance, curriculum construction, history and philosophy of education, educational psychology and measurement, supervision and education of teachers, English (also science and social science in the schools), elementary, secondary, higher, physical, music and business education Prerequisites at least 18 undergraduate hours of education and related courses in psychology Ed D also offered in this field Administered by College of Education Faculty 13 full time, 11 part time 262 graduate students enrolled

Electrical Engineering Prerequisites courses equivalent to work required at this University for the BS in Elec Eng Faculty 8 full time, 4 part time 45 graduate students enrolled

English and Speech English literature, American literature Prerequisites 24 semester hours in English (exclusive of composition and speech), including the survey of English literature (16 hours of these credits must be in upper division

courses), working knowledge of French and German Faculty 19 full time 33 graduate students enrolled.

Geology, Mineralogy, Paleontology Prerequisites 10 semester hours of general geology, 8 each of mineralogy, invertebrate paleontology and stratigraphy, field and structural geology, and geologic reports, a full year's course in physics, chemistry, and mathematics Faculty 15 full time, 2 part time, 88 graduate students enrolled

History American English, modern European, medieval, Latin American, Pacific and Near East, ancient, and Oriental history Prerequisites satisfactory background, familiarity with certain selected fields of history, acquaintance with the fundamental tools of historical scholarship, and an indication of ability to do original work. Recommended courses in government, geography, and economics Faculty 10 full time 38 graduate students enrolled

Laboratory Medicine and Clinical Pathology Faculty 7 full time 1 graduate student enrolled.

Mathematics Prerequisites 30 semester hours in mathematics, including higher algebra and a course in either differential equations or advanced calculus, a year's work in physics, capability of doing independent research in mathematics Faculty 5 full time, 3 part time. 27 graduate students enrolled

Medicine General medicine general practice, dermatology and syphilology, industrial medicine, and neurology Faculty 18 full time 17 graduate students enrolled.

Microbiology Bacteriology Prerequisites theoretical and laboratory training in general biology, inorganic and organic chemistry, and physics Faculty 7 full time 7 graduate students enrolled

Modern Languages and Literatures French, German, Spanish Prerequisites a reading, speaking, and writing knowledge of the major and first minor language, a general knowledge of the literature and civilization of the country of the first major language, acquaintance with the main currents of the literature of the country of the first minor language Faculty 19 full time 34 graduate students enrolled

Obstetrics and Gynecology Faculty 3 full time. 8 graduate students enrolled

Pathology Prerequisites MD or MB Faculty 21 full time. 6 graduate students enrolled.

Pediatrics Faculty 7 full time 4 graduate students enrolled

Pharmacology Prerequisites introductory biology or general zoology, general inorganic, organic, and physical chemistry, general and advanced physics, statistics, reading knowledge of either French or German Faculty 3 full time 4 graduate students enrolled.

Pharmacy Pharmaceutical chemistry Prerequisites BS in pharmacy or its equivalent in training, physical chemistry, advanced organic chemistry Faculty 5 full time 14 graduate students enrolled

Philosophy Prerequisites at least 18 hours in undergraduate courses in this subject, including history of philosophy Only applicants who were outstanding at the master's level will be accepted Faculty 10 full time 7 graduate students enrolled

Physical Medicine and Rehabilitation Physical medicine, physical therapy Faculty 1 full time plus a clinical staff

Physics Prerequisites a good working knowledge of mathematics, including differential equations, general inorganic chemistry, physics courses equivalent to an undergraduate major at this University Faculty 12 full time 50 graduate students enrolled

Physiology Prerequisites general biology, inorganic and organic chemistry physics, college mathematics (including calculus) Recommended invertebrate and comparative zoology, embryology, physical chemistry general physiology, statistics Faculty 5 full time 8 graduate students enrolled

Political Science Prerequisites 16 semester hours of undergraduate work in political science, or 12 semester hours in political science and 8 semester hours in the allied subjects of economics, sociology, or history Faculty 8 full time 17 graduate students enrolled.

Psychiatry Faculty 14 full time 2 graduate students enrolled

Psychology General, experimental, and clinical psychology Prerequisites courses covering the fundamental concepts and principles of undergraduate psychology, statistics, work equivalent to that required for the master's degree Faculty 10 full time, 5 part time 67 graduate students enrolled.

Radiology Faculty 6 full time 3 graduate students enrolled

Sociology Prerequisites 16 hours of undergraduate work in sociology, or 12 hours in sociology and 8 hours in allied subjects of economics, political science, anthropology or psychology Faculty 6 full time 11 graduate students enrolled

Study of Human Growth Child development, physical growth Faculty 6 full time

Surgery Experimental and special surgery, anesthesiology, ophthalmology, orthopedic surgery, otolaryngology, urology Faculty 6 full time 15 graduate students enrolled

Columbia University

NEW YORK 27, NEW YORK

Graduate Faculties of Political Science, Philosophy and Pure Science

Among the earliest of American institutions to develop graduate study, Columbia awarded her first doctorate in 1875 Five years later, the Faculty of Political Science was formally established, to be followed in 1890 by the Faculty of Philosophy and in 1892 by the Faculty of Pure Science These three faculties comprise 33 departments, staff seven regional institutes and programs (Russian, East Asian, European, Near and Middle East, Israeli, East Central European, and International Affairs), and supervise interdisciplinary work under twelve standing committees (Applied Mathematics, Applied Mechanics, Biophysics, Business, Education, Geography, Human Variation, Industrial Engineering Nutrition, Parasitology, Religion, and Social Psychology)

Students are primarily under the supervision of a department rather than a faculty or a school. Doctoral candidates choose and work with a sponsor Lecture classes are small (forty or more is unusual), and seminars are kept under twelve Working arrangements maintained with neighboring institutions for scholarly purposes are regularly accredited

Allied divisions offering doctoral degrees are Law School (JSD), College of Physicians and Surgeons (Med Sc D), School of Library Science (DLS), New York School of Social Work (DSW), School of Public Health (DPH), Teachers College (Ed.D), School of Engineer

ing (Eng.Sc.D)

Resident facilities on campus for men and women, University owned apartments for married students Registry of off campus accommodations

Specialized laboratories, departmental libraries, two observatories, biological field station, drama museum, foreign language centers, social research bureau, institutes, and special collections on religion, economics, Russian, international law, music, and philosophy Affiliations with Cold Spring Harbor Biological Laboratory, Woods Hole Marine Biological Laboratory, and the Commonwealth Observatory at Mt Stromboli in Australia

Men and women Summer and some evening classes 299 Ph.D's awarded in 1956-7

Residence requirements for doctorate two academic years of residence (a year is defined as 30 semester hours of course credit), of which a maximum of one year may be earned elsewhere

ADMISSION REQUIREMENTS

Baccalaureate degree, with an average of at least B in this University's terms, many departments require a higher average

Language two out of three (German, French, Latin) for admission to English Department In many other departments at least one of the two required languages (generally German and French) is desirable, but not required Unless otherwise indicated French and German are required for the Ph.D

Apply to Graduate Faculties Admissions Officer at least one full month prior to date for which admission is sought Address Office of University Admissions, 322 University Hall, Columbia University, New York 27, N.Y.

FEES AND FIRST YEAR AID

Tuition—\$450 per semester, plus \$34 medical and university fees Room—men \$200 \$410 a year, women \$230 \$455 a year Board—\$350 a year

Fellowships, scholarships, and grants in aid Apply to Office of University Admissions, applications must be filed by February 20 for next academic year

FIELDS OF STUDY FOR THE PH.D

Anatomy Scientific German and French required Faculty 19 part time from College of

Physicians and Surgeons Program administered by Faculty of Pure Science 5 graduate students enrolled.

Anthropology Physical anthropology, archaeology, ethnology, linguistics Prerequisites general faculty requirements, general anthropology, any two modern languages, but not too closely related Program administered by Faculty of Political Science Faculty 18 full time 115 graduate students enrolled

Applied Mathematics Extensive application of advanced mathematical methods to problems in physical science and engineering Combined program with Watson Scientific Computing Laboratory Prerequisites at least six college semesters of physical science and mathematics, including calculus through partial derivatives and multiple integrals, two languages from French, German, Russian Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction 17 graduate students enrolled.

Architecture and Planning and Housing Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction 6 graduate students enrolled

Astronomy Prerequisites thorough knowledge of general astronomy, training in mathematics and the physical sciences corresponding to 3 years of college mathematics, 2 years of physics, and 1 year of chemistry, or the equivalent. Program administered by Faculty of Pure Science Faculty 7 full time 3 graduate students enrolled

Biochemistry Prerequisites knowledge of physics, chemistry, and biology sufficient to meet the requirements of this University for admission to the study of medicine. Preference is given to applicants who have completed more advanced courses in analytical, organic, and physical chemistry Interview is required unless applicant can produce proof of exceptional training and ability through personal recommendations from instructors Program administered by Faculty of Pure Science Faculty 31 part time from College of Physicians and Surgeons 24 graduate students enrolled

Biophysics Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction 9 graduate students enrolled.

Botany Prerequisites knowledge of general botany gained from a study of plants in the lab-

oratory and in the field, equivalent of an undergraduate course in botany pursued for two to three years, college training in chemistry, ability to read either French or German Knowledge of zoology desirable Program administered by Faculty of Pure Science Faculty 17 full time, 5 part time from New York Botanical Garden 28 graduate students enrolled

Business Faculty of the Graduate School of Business Approx 20 graduate students enrolled

Chemical Engineering Two languages from French, German Russian Recommended thorough undergraduate training in physics, physical and organic chemistry, mathematics through simple differential equations, chemical technology, unit operations of chemical engineering, strength of materials and the elements of electrical engineering, ability to read one or more of the following languages—French, German, Russian Eng Sc D also awarded in this field Program administered by Faculty of Pure Science Faculty 19 part time from School of Engineering 18 graduate students enrolled

Chemistry Prerequisites substantial undergraduate courses in general and inorganic, analytical, organic, and physical chemistry, embracing laboratory experience in all categories, at least one year of college physics, mathematics through differential and integral calculus, German and either French or Russian Program administered by Faculty of Pure Science Faculty 29 full time 116 graduate students enrolled

Chinese and Japanese One language required Recommended preparation in Chinese or Japanese Program administered by Faculty of Philosophy Faculty 12 full time 15 graduate students enrolled

Civil Engineering and Engineering Mechanics Applied mechanics, fluid mechanics and hydraulics, soil mechanics, and structures (including aircraft) Language requirements German and choice of French, Italian, or Russian Eng Sc D also awarded in this field. Program administered by Faculty of Pure Science Faculty 26 part time from School of Engineering 23 graduate students enrolled

Economics Prerequisite and recommended courses accounting, business cycles, corporation and investment finance economic geography, economic history (required) economic theory (required), history of economic thought, industrial organization and control, international trade

and finance, labor problems and industrial relations, mathematical economics, monetary economics, prices, public finance, public utilities (including transportation), statistics (required), comparative economic organization, economic organization of Soviet Russia, any one other subject approved by the executive officer of the department Language requirements French and German, with possible substitutions Recommended basic undergraduate training in economics and knowledge of its general literature and methods, for more advanced work, greater advantage in undergraduate study of history, philosophy, modern languages and (especially) mathematics Program administered by Faculty of Political Science Faculty 53 full time 203 graduate students enrolled.

Education Program administered by Teachers College Ed D also awarded in this field. Approximately 250 graduate students enrolled

Electrical Engineering Prerequisites BS in the field of electrical engineering from an accredited (Engineers Council for Professional Development) engineering school, or education equivalent to that represented by such a degree Eng Sc D also awarded in this field. Program administered by Faculty of Pure Science Faculty 29 part time from School of Engineering 8 graduate students enrolled

English and Comparative Literature The history of the English language, Anglo Saxon grammar, translation, literature, the Middle English period, the 16th century, the 17th century, the 18th century, the Romantic movement, Victorian literature, American literature, 1820 1900, contemporary literature, the English drama French, German, and Latin required Program administered by Faculty of Philosophy Faculty 27 full time 585 graduate students enrolled

Fine Arts and Archaeology Arts of a culture, or of a single country or region throughout its history (e.g. Egypt, Persia India China, Japan, Greece Italy, France, England, Spain, Germany, United States, Latin America, including pre-Columbian), arts of an epoch or period in several countries (e.g. ancient Orient, classic, primitive, including prehistoric, early Christian, and medieval), Renaissance, including Baroque, post Renaissance including contemporary Prerequisites undergraduate courses amounting to at least 18 points, or the equivalent in the history of fine arts or in acceptable studies leading to ar

chaeology, French, German, and a third language Program administered by Faculty of Philosophy Faculty 22 full time. 58 graduate students enrolled

Geography Program administered by Standing Subcommittee of Joint Committee on Instruction. 19 graduate students enrolled

Geology Economic geology, vertebrate and invertebrate paleontology, geophysics, mineralogy, stratigraphy, geochemistry, petrology, geomorphology Prerequisites undergraduate major in geology, chemistry, physics, or zoology, courses extending through one year in at least three of the following—chemistry, mathematics, physics, zoology Additional training in geology chemistry mathematics or physics biology or engineering subjects may be required in certain branches of the department. Recommended reading knowledge of French and German. Program administered by Faculty of Pure Science. Faculty 21 full time 76 graduate students enrolled.

Germanic Languages Prerequisites speaking, reading, and writing facility in German, a background in Classical period of German literature, French, German, or a Scandinavian language Program administered by Faculty of Philosophy Faculty 7 full time. 27 graduate students enrolled.

Greek and Latin Prerequisites background in Greek and Latin language and literature, French and German. Program administered by Faculty of Philosophy Faculty 9 full time 30 graduate students enrolled.

Hispanic Prerequisites reading, writing, and speaking facility in Spanish, general knowledge of Spanish literature and civilization, Latin, French, and German Program administered by Faculty of Philosophy Faculty 9 full time 66 graduate students enrolled.

History Ancient history medieval history, modern history of Western Europe, modern history of Eastern Europe, history of Great Britain, British Empire, American history, East Asiatic history, history of European thought. Two foreign languages required Program administered by Faculty of Political Science Faculty 58 full time 503 graduate students enrolled

Human Variation Combined program with Institute on Human Variation. Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction. 3 graduate students enrolled

Industrial Engineering Eng.Sc.D also awarded in this field. Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction. 22 graduate students enrolled.

Italian Prerequisites knowledge of Italian language and literature, Latin, French, and German. Program administered by Faculty of Philosophy Faculty 6 full time. 14 graduate students enrolled.

Linguistics General linguistics, phonetics, Yiddish studies, comparative linguistics, areal linguistics French and German required. Program administered by Faculty of Philosophy Faculty 3 full time. 16 graduate students enrolled.

Mathematical Statistics Two languages required, usually selected from French, German, and Russian. Recommended broad background in mathematics thorough knowledge of calculus. Program administered by Faculty of Political Science. Faculty 8 full time. 43 graduate students enrolled.

Mathematics Prerequisites one year of differential and integral calculus, ability to read at least two foreign languages, preferably French and German. Program administered by Faculty of Pure Science Faculty 23 full time 82 graduate students enrolled.

Mechanical Engineering Two languages required. Eng.Sc.D also awarded in this field. Faculty 24 part time from School of Engineering 17 graduate students enrolled.

Microbiology Prerequisites elementary biology, physics and general inorganic and organic chemistry, quantitative analysis, calculus Undergraduate work in scientific subjects must be of high grade. Program administered by Faculty of Pure Science. Faculty 14 part time from College of Physicians and Surgeons 5 graduate students enrolled.

Mining, Metallurgical, and Mineral Engineering Eng.Sc.D also awarded in this field. Program administered by Faculty of Pure Science. Faculty 18 part time from School of Engineering. 6 graduate students enrolled

Music Prerequisites ability to read orchestral scores and play the piano with reasonable facility, emphasis in undergraduate work in historical and theoretical subjects. Program administered by Faculty of Philosophy Faculty 29 full time. 49 graduate students enrolled.

Near and Middle East Languages Semitic (Hebrew, Akkadian, Arabic, Aramaic, and Syr

rac), Turkish, Indo-Iranian (Sanskrit and Hindi, Urdu, Bengali, Persian, Armenian) Program administered by Faculty of Philosophy Faculty 14 full time 11 graduate students enrolled

Parasitology Combined program with School of Public Health Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction. 2 graduate students enrolled

Pathology Prerequisite M.D. or similar training Program administered by Faculty of Pure Science Faculty 6 part time from College of Physicians and Surgeons

Pharmacology Prerequisites knowledge of physics chemistry, and biology sufficient to meet the requirements in this University for admission to the study of medicine Program administered by Faculty of Pure Science Faculty 6 part time from College of Physicians and Surgeons 5 graduate students enrolled

Philosophy Aesthetics ethics, logic, metaphysics Program administered by Faculty of Philosophy Faculty 23 full time 151 graduate students enrolled

Physics Prerequisites three years physics, with laboratory work and working knowledge of ordinary differential equations German and either French or Russian. Program administered by Faculty of Pure Science Faculty 33 full time 205 graduate students enrolled

Physiology Prerequisites good preparation in physics and organic and physical chemistry, mathematics including differential and integral calculus, a course in anatomy Program administered by Faculty of Pure Science Faculty 13 part time from College of Physicians and Surgeons 4 graduate students enrolled

Public Law and Government American political institutions foreign political institutions international law and relations, Roman law comparative jurisprudence, political and social philosophy Two languages required Program administered by Faculty of Political Science Faculty 43 full time 349 graduate students enrolled

Psychology Prerequisites fundamental training in mathematics one year at college level in two of the following—physics, chemistry biology general psychology, elementary statistics and undergraduate experimental psychology. GRE Program administered by Faculty of Pure Sci

ence Faculty 19 full time 83 graduate students enrolled.

Religion History of religion, literature of religion, philosophy of religion and ethics, religion and society Applicants should apply for admission both to Columbia University and to Union Theological Seminary. if admitted, they must register at both institutions Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction, consisting of faculty members from Columbia and from Union Theological Seminary See also Union Theological Seminary *infra* 61 graduate students enrolled.

Romance Philology and French French language and history of French literature, Romance philology Prerequisites some skill in reading, writing, hearing, and speaking French, general knowledge of French literature, undergraduate training in Latin and German, ability to write clear and literate English. Recommended preparation in another Romance language Program administered by Faculty of Philosophy Faculty 16 full time. 127 graduate students enrolled

Slavic Languages Slavic languages, literature of one Slavic country Prerequisites acceptable knowledge of one Slavic language and some knowledge of the literature of that language, French and Greek. Applicants who wish to concentrate on Slavic philology should have an acceptable knowledge of two Slavic languages and some knowledge of their literature. Recommended training in either Latin or Greek. Program administered by Faculty of Philosophy Faculty 15 full time 49 graduate students enrolled.

Social Psychology Combined program with Teachers College Prerequisites special aptitude test or GRE Program administered by Standing Subcommittee of Joint Committee on Graduate Instruction 26 graduate students enrolled

Sociology Advanced methodology, family and marriage, formal organization, history of sociology occupations and professions, political sociology, population public opinion or communication, social change, systematic sociological theory stratification, religious institutions, urban rural sociology Two languages required Recommended statistics research methods, sociological theory Program administered by Faculty of Political Science Faculty 17 full time 119 graduate students enrolled.

Uralic and Altaic Languages Uralic compar

ative philology, Hungarian and Finnish language and literature, Altaic comparative Altaic philology (Turkic, Mongolian, Manchu Tungus, Korean), Turkish language and literature. Prerequisites: reading knowledge of at least two of the following languages for concentration in the Uralic section—Hungarian, Finnish, Russian, German, in the Altaic section—Russian, German, French, Turkish, Hungarian, knowledge of either Chinese or Japanese for concentration in the Eastern area of the Altaic group. Program administered by Faculty of Philosophy. Faculty 3 full time. 1 graduate student enrolled.

Zoology Prerequisites: course experience in the general principles of biology, comparative morphology and classification of animals, embryology, histology, and genetics, college training in physics and in chemistry through organic. Recommended knowledge of botany, physiology, calculus. Program administered by Faculty of Pure Science. Faculty 19 full time. 55 graduate students enrolled.

The University of Connecticut

STORRS, CONNECTICUT

The Graduate School

Organized 1939. Master's degree first conferred in 1920, the doctorate in 1949. All graduate work in all fields of study is under the supervision of the Graduate School.

Work in agricultural sciences is facilitated through Storrs Agricultural Experiment Station. Affiliations with state and local hospitals for in-service training in clinical psychology and speech pathology, Marine Historical Assn., Institute of American Maritime History. University has institutes of labor management, public service, gerontology.

Men and women. Summer and evening courses in some fields. 34 Ph.D.s awarded in 1956-7.

Residence requirements for doctorate: a minimum of 3 years full time study beyond the bachelor's degree, or 2 years beyond the master's degree, minimum of one year of full time study, constituting the second or third year of work beyond the bachelor's degree, must be completed in residence.

Transfer students must have grades of B

or above in all courses offered in transfer toward the doctorate.

ADMISSION REQUIREMENTS

Bachelor's degree or equivalent, cumulative quality point ratio of 26 or higher in the undergraduate record or an average of B in the last two years of undergraduate work. Recommended MAT, GRE. Apply to Dean of Graduate School.

FEES AND FIRST YEAR AID

Tuition—\$150 per academic year. Room—\$150-\$190.

Graduate assistantships, part time instructorships. Apply to Dean of Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Agricultural marketing, production economics. Faculty 15 full time, 3 part time. 5 graduate students enrolled.

Animal Industries Animal nutrition. Faculty 26 full time, 2 part time. 1 graduate student enrolled.

Animal Pathology Prerequisites: D.V.M. Faculty 35 full time, 3 part time. 1 graduate student enrolled.

Bacteriology Faculty 5 full time, 4 graduate students enrolled.

Botany Cytology, plant systematics. Faculty 6 full time, 2 graduate students enrolled.

Chemistry Analytical, inorganic, organic, physical. Faculty 22 full time, 6 part time. 23 graduate students enrolled.

Education Administration, elementary, evaluation and measurement, guidance, industrial, secondary, supervision and curriculum development. Faculty 25 full time, 85 graduate students enrolled.

Electrical Engineering Network theory and feedback control systems. Faculty 11 full time, 4 part time.

Genetics Animal genetics, plant genetics. Faculty 7 full time, 2 graduate students enrolled.

Pharmacy Pharmacology, pharmaceutical chemistry, pharmacognosy, pharmacology. Faculty 12 full time, 12 graduate students enrolled.

Physics Acoustics, atomic, molecular and nuclear, low temperature, optics, theoretical. Faculty 12 full time, 3 part time. 16 graduate students enrolled.

Poultry Science Poultry nutrition. Faculty 15 full time, 2 graduate students enrolled.

Psychology Clinical general experimental personality and social Prerequisites MAT or GRE Faculty 13 full time, 7 part time 34 graduate students enrolled

Sociology Rural sociology Faculty 16 full time, 6 part time 2 graduate students enrolled

Zoology and Entomology Biochemistry, embryology, entomology, parasitology physiology, vertebrate zoology Faculty 17 full time, 4 part time. 10 graduate students enrolled

NOTES

Courses acceptable for graduate credit are not confined to departments in which a student is doing his major work. Graduate students may draw on departmental offerings throughout the institution providing they are of an advanced character, are in line with the student's objectives and are approved as a part of the plan of study.

Seminar in the Teaching of Introductory Psychology is a survey of the literature of teaching of introductory psychology. Each student will teach under supervision at least one laboratory section in introductory psychology each semester.

Cornell University

ITHACA, NEW YORK

The Graduate School

Graduate work leading to advanced degrees was offered as early as 1875, and the Graduate School was founded in 1909. Each student accepted as a candidate for an advanced degree in one of the 69 fields of study selects a Special Committee from among the faculty in the field of his major and minor work and develops a program of study. Each Special Committee supervises the student's study, judges his performance, and recommends him for the appropriate degree.

Research facilities: NY State Agricultural Experiment State at Geneva, Cornell Aeronautical Laboratory at Buffalo, centers for social science research, statistics housing research, and aerial photographic studies as well as other research units.

Summer courses 181 Ph.D.s awarded in 1956-7

Residence requirement for doctorate minimum of three academic years

ADMISSION REQUIREMENTS

Bachelor's degree from institution of recognized standing, or equivalent work, adequate preparation in chosen field, as judged by previous scholastic record or other achievements, must show promise of doing well in advanced study and research.

Language requirements for master's, requirement specified by each field of instruction, for the Ph.D., candidates whose native language is English must pass examinations in French and German or have an approved substitute.

GRE required in economics, geology and geography, history, industrial and labor relations, music, psychology, and zoology. MAT also required in psychology and some major divisions of education.

Apply to Graduate School, 125 Day Hall, between October and February 15 for best consideration for the beginning of an academic year.

FEES AND FIRST YEAR AID

Tuition—\$1,100—endowed fields, \$475—state fields. Tuition includes fees.

Thirty-two Cornell Graduate Fellowships, plus a large number of industrial fellowships, covering tuition and fees and providing a stipend of \$1,500. Stipends on some industrial fellowships are higher. Apply to Graduate School, 125 Day Hall, no later than February 15 for following academic year.

FIELDS OF STUDY FOR THE PH.D.

Aeronautical Engineering Faculty 5 full time 10 graduate students enrolled

Agricultural Economics Economics of agriculture, farm management, prices and statistics, marketing and business management, public administration and finance Faculty 27 full time 47 graduate students enrolled

Agricultural Engineering Farm electrification, farm structures, power and machinery, soil and water engineering, agricultural engineering Faculty 14 full time 10 graduate students enrolled

Agronomy Soils, field crop production Faculty 21 full time 50 graduate students enrolled.

Animal Breeding and Physiology Animal breeding animal genetics Faculty 10 full time 17 graduate students enrolled

Animal Husbandry Animal husbandry nutrition, and breeding, dairy husbandry Faculty 23 full time 10 graduate students enrolled

Animal Nutrition Faculty 11 full time 32 graduate students enrolled

Astronomy Astronomy astrophysics Faculty 2 full time.

Bacteriology Bacteriology, pathogenic bacteriology Faculty 12 full time 12 graduate students enrolled

Biochemistry Faculty 15 full time 20 graduate students enrolled

Botany General botany cytology, economic botany, paleobotany phycology, plant morphology and anatomy, plant physiology, plant taxonomy and ecology Faculty 18 full time 23 graduate students enrolled

Business and Public Administration The administrative process, finance and accounting, supply, production, and distribution, managerial economics and politics Faculty 18 full time 7 graduate students enrolled.

Chemical Engineering Faculty 10 full time 20 graduate students enrolled

Chemistry Inorganic analytical, organic, and physical chemistry Faculty 20 full time 89 graduate students enrolled

Child Development and Family Relationships Faculty 12 full time 31 graduate students enrolled

City and Regional Planning City planning regional planning Faculty 3 full time 12 graduate students enrolled

Civil Engineering Geodetic and photogrammetric, hydraulics management, sanitary, structural, soils, and transportation engineering, hydraulics, aerial photographic studies Faculty 22 full time 28 graduate students enrolled

Classics Latin, Medieval and Renaissance Latin literature, ancient history, Greek, classical archaeology Faculty 6 full time 9 graduate students enrolled

Conservation Fishery, biology, oceanography, vertebrate zoology, wildlife management Faculty 14 full time 32 graduate students enrolled

Dairy Science Dairy science, dairy chemistry Faculty 11 full time 8 graduate students enrolled

Economics Economic history, economic theory and its history, industrial organization, control and finance, international economics, labor economics, monetary economics and fiscal policy,

public finance, economic statistics, trade fluctuations and determination of output and income Faculty 11 full time 20 graduate students enrolled

Economics of the Household and Household Management Faculty 6 full time 17 graduate students enrolled

Education and Rural Education Agricultural, elementary, extension and adult, industrial, nature, science, and conservation education, educational administration and supervision, education at psychology and measurement, guidance and personnel administration, history and theory of education, secondary education and curriculum Faculty 35 full time 157 graduate students enrolled.

Electrical Engineering Power, control systems, and communication engineering, electrical engineering in general Faculty 28 full time 30 graduate students enrolled

Engineering Mechanics and Engineering Materials Mechanics, fluid mechanics Faculty 6 full time 11 graduate students enrolled

Engineering Physics Faculty 14 full time 19 graduate students enrolled

English Language and Literature Medieval, American, and dramatic literature, Old and Middle English, the English Renaissance to 1660 the Restoration and the 18th Century, the 19th Century and after, English poetry, prose fiction Faculty 25 full time 44 graduate students enrolled

Entomology and Limnology Apiculture, medical and economic entomology, insect morphology and histology, insect ecology, embryology, taxonomy, physiology, and toxicology, insecticide chemistry, parasitology, limnology Faculty 40 full time 55 graduate students enrolled

Far Eastern Studies Chinese literature (offered principally as a minor for students with a major in one of the established disciplines) Faculty 11 part time 1 graduate student enrolled

Floriculture and Ornamental Horticulture Faculty 7 full time. 15 graduate students enrolled

Food and Nutrition Faculty 12 full time 24 graduate students enrolled.

Food Technology Faculty 9 full time

General Biology Faculty 2 full time 4 graduate students enrolled.

General Linguistics Faculty 9 full time. 8 graduate students enrolled

Geology and Geography Economic geology

geography, geomorphology, mineralogy and petrology, paleontology and stratigraphy, structural geology and sedimentation. Faculty 7 full time 19 graduate students enrolled

German German literature and linguistics Faculty 4 full time 6 graduate students enrolled

Government American government and institutions comparative government, constitutional law, international law and organization, international relations, political theory, public administration Faculty 8 full time 27 graduate students enrolled

History American, ancient, Far Eastern, English, medieval, modern European, and Slavic history, history of science Faculty 13 full time 32 graduate students enrolled

Home Economics Education Faculty 5 full time 12 graduate students enrolled

Hotel Administration Faculty 12 full time 2 graduate students enrolled

Housing and Design Faculty 7 full time 4 graduate students enrolled

Industrial and Labor Relations Collective bargaining, economic and social statistics human relations in industry, industrial education, labor market analysis and economics, labor union history and administration, personnel administration, social security and protective legislation Faculty 33 full time 56 graduate students enrolled

Mathematics Algebra analysis, geometry, applied mathematics Faculty 18 full time 23 graduate students enrolled

Mechanical Engineering Administrative, automotive, heat power and industrial engineering, engineering drawing machine design, materials processing applied industrial statistics operations research Faculty 33 full time 42 graduate students enrolled

Metallurgical Engineering Faculty 4 full time 1 graduate student enrolled

Music Musicology Faculty 6 full time 10 graduate students enrolled

Philosophy Aesthetics, epistemology, ethics, history of philosophy, logic, metaphysics, philosophy of religion, political philosophy Faculty 10 full time 17 graduate students enrolled

Physics Physics, experimental physics, theoretical physics. Faculty 26 full time 116 graduate students enrolled

Plant Breeding Plant breeding, genetics Faculty 23 full time 29 graduate students enrolled

Plant Pathology Mycology, plant pathology Faculty 31 full time 35 graduate students enrolled

Pomology Faculty 7 full time 5 graduate students enrolled

Poultry Husbandry Animal genetics, animal nutrition, chemical embryology, poultry husbandry Faculty 10 full time 2 graduate students enrolled

Psychology Comparative, experimental, industrial, and personality and social psychology, differential psychology and psychological tests, experimental psychopathology, history of psychology and systematic psychology Faculty 14 full time 21 graduate students enrolled

Romance Studies French literature, Italian, French, Romance, and Spanish linguistics, Spanish literature Faculty 5 full time 18 graduate students enrolled

Rural Sociology Faculty 10 full time 22 graduate students enrolled

Russian Russian literature Slavic linguistics Faculty 2 full time 2 graduate students enrolled

Seed Technology Faculty 4 full time

Sociology and Anthropology Sociology, social psychology cultural anthropology Faculty 14 full time 37 graduate students enrolled

Speech and Drama Rhetoric and public address drama and the theatre, speech and phonetics, general linguistics Faculty 7 full time 17 graduate students enrolled

Statistics Faculty 5 full time 6 graduate students enrolled

Vegetable Crops Faculty 21 full time 20 graduate students enrolled

Veterinary Medicine Veterinary anatomy, pathology virology, medicine, obstetrics and diseases of the reproductive organs, and surgery, animal physiology, parasitology Faculty 30 full time 19 graduate students enrolled

Zoology Comparative anatomy, comparative and cellular physiology, comparative neurology, ecology, endocrinology, histology and embryology, invertebrate zoology Faculty 8 full time 21 graduate students enrolled

NOTES

Student figures listed represent total number of graduate students registered in each field for all advanced degrees, not just Ph D

University of Delaware

NEWARK, DELAWARE

School of Graduate Studies

Organized in 1950 Formally organized and individually planned courses, seminars, and research projects provide training which makes it possible for students to discharge responsibilities they assume when taking positions in schools or colleges, industry, engineering or agriculture, or engage in specialized services for museums, libraries, or governmental agencies

Dormitories for married students under construction Accommodations for a limited number of women graduate students in dormitories Special libraries and technical collections Research facilities in absorption spectroscopy, X ray diffraction, distillation, polarography, radio frequency, spectroscopy, and biological fields Marine field laboratory at Lewes, Del, and arrangements for use of research laboratories of certain nearby industries, especially chemistry

Men and women Summer and evening courses 20 Ph D's awarded in 1956 7

Residence requirement for doctorate one continuous academic year on campus

ADMISSION REQUIREMENTS

Prerequisites for admission to Graduate School and to candidacy are determined by each department

German and French or, in some instances, Russian

Apply to School of Graduate Studies at least one month prior to official registration

FEES AND FIRST YEAR AID

Tuition—in state, \$13 per credit hour, out of state, \$13 per credit hour plus \$35 non resident fee (summer school only) Room—men, \$4 \$10 per week in private homes

Fellowships, scholarships, and assistantships are available Apply directly to the department offering the fellowships

FIELDS OF STUDY FOR THE PH D

Biological Sciences Botany, bacteriology, marine biology, physiology, zoology Prerequisites 30 credits of general biology, including work in

botany and zoology, college physics with laboratory, inorganic and organic chemistry, one year of college mathematics, French or German Letters of recommendation are required for admission There is a cooperative program with the School of Agriculture, in which a student may do his doctoral research under the direction of a staff member of the Agricultural Experiment Station Faculty 11 full time 11 graduate students enrolled

Chemical Engineering Prerequisites BS in chem eng from accredited curriculum, or BS in chemistry, physics, or another branch of engineering (provided certain undergraduate courses are taken without credit), reading knowledge of any two of German, French, or Russian Recommended M.Ch.E Faculty 5 full time, 4 part time 35 full time graduate students enrolled, approximately 60 part time

Chemistry Biochemistry, analytical, inorganic, organic, polymer, and physical chemistry Combined programs with biology, physics, and chemical engineering Prerequisites general, organic, and physical chemistry, qualitative and quantitative analysis, general physics, integral and differential calculus Recommended German and French Faculty 9 full time, 3 part time 75 graduate students enrolled

Physics Microwave spectroscopy, nuclear magnetic resonance Faculty 5 full time

University of Denver

DENVER 10, COLORADO

Graduate College

The Graduate Division was organized in 1891 The Graduate College, established in 1930, has general responsibility for all graduate studies offered in the University The graduate School of Social Work and the School of Librarianship are under the direct supervision of the Dean of the Graduate College Other divisions operate through the appropriate undergraduate colleges

Apartments are available in residence halls for graduate students and families, Templin Hall is reserved as a graduate women's dormitory Opportunities for field work and internship are available at four hospitals for students in psy-

chology and social work. High altitude studies can be pursued at University laboratories on Mt. Evans (14,150 feet) and Echo Lake (10,700 feet) Special work is done in infrared and related phenomena.

Summer and evening courses 26 Ph.D s awarded in 1956-7

Residence requirement for doctorate 6 quarters.

ADMISSION REQUIREMENTS

General superiority at the master's degree level. Letters of reference

Language prerequisites are determined individually by the departments concerned.

School of Education requires Advanced GRE CAVD examination is required by the School of Education and the Department of Psychology

Apply to Office of Admissions at least 8 weeks in advance of registration.

FEES AND FIRST YEAR AID

Tuition—\$14 per quarter hour for all students

Limited number of teaching, research, and clinical fellowships available. Apply to Dean, Graduate College, before March 15

FIELDS OF STUDY FOR THE PH D

Education Elementary and secondary education (teaching, administration, curriculum), administration, counseling and guidance, higher education, special education Combined program with Psychology Department. Prerequisites undergraduate major and/or minor, graduate major and/or minor (except in higher education field), CAVD GRE (Advanced) Faculty 9 full time, 7 part time 370 graduate students enrolled

English Creative writing, American studies, American literature Combined program with Speech and Theatre Departments Prerequisites undergraduate major or minor in English, graduate major in English two foreign languages from French, German, and Spanish. Faculty 5 full time, 2 part time 27 graduate students enrolled.

Psychology General, mental testing, counseling and guidance, clinical, experimental, educational, psycho-therapy Combined program with Education Department. Prerequisites undergraduate and graduate major and/or minor in psy

chology, CAVD Faculty 11 full time, 3 part time 83 graduate students enrolled.

Speech Public address, speech pathology and audiology, communication. Combined program with English and Theatre Departments Prerequisites undergraduate and/or graduate major or minor in Speech. Faculty 7 full time, 4 part time. 51 graduate students enrolled.

Theatre Production, acting, writing, children's theatre Combined program with Departments of Speech and English Prerequisites undergraduate and graduate major or minor in the theatre, speech, and/or English, two foreign languages from French, German, or Spanish. Faculty 4 full time, 3 part time 34 graduate students enrolled

NOTES

The School of Education offers a sequence of courses, including internship in higher education.

Drew University

MADISON, NEW JERSEY

The Graduate School

From 1867 until 1928, Drew was a university under the auspices of the Methodist Church functioning as a theological seminary In 1928 the Brothers College of Liberal Arts was founded, and in 1955 the Graduate School was organized.

The purpose of the Graduate School is to prepare men and women for positions of leadership in religion and education to develop potential college and seminary teachers, ministers who will become authorities in some branch of Christian learning, men and women who may qualify for supervisory positions in education and religion.

A Graduate School Student Faculty Colloquium, which meets fourteen times during the academic year sets the intellectual life of the school. Leaders for the meetings are brought in from leading universities of America and Europe.

Men and women 5 Ph.D s awarded in 1956-7 Residence requirement for doctorate three years of full time study, however, in some cases

the possession of a B D reduces the residence requirement to two years

ADMISSION REQUIREMENTS

Bachelor's degree or its equivalent, high academic achievement, evidence of character, maturity and promise of scholarly and personal leadership

A working knowledge of French, German, and such other languages as are required for study in the field of concentration, must be demonstrated by examination at the beginning of the graduate program, one of the modern languages may be postponed until the close of the first semester of graduate study

GRE Aptitude Test sometimes required

Apply before April 1 to Office of Graduate School Admissions

FEES AND FIRST YEAR AID

Tuition—\$375 per semester of full time study
Room—\$40 \$75 per month Board—\$195 per semester

Fellowships ranging in value up to \$1,200 are available to a limited number of students with unusually high academic qualifications Apply before April 1 to Committee on Scholarships, Office of the Graduate School

FIELDS OF STUDY FOR THE PH D

Theological Studies Bible, church history and Christian thought theology, religion and personality, religion and society Prerequisites each application considered on its own merits by the Admissions Committee, if applicant meets general admission requirements listed above At the end of the first year of residence, preliminary examinations are required, comprehensive examinations are required at the end of residence 32 graduate students enrolled

NOTES

Plans are underway to establish a Division of Humanities at Drew

To increase the effectiveness of the doctoral candidate as a teacher the University operates a program of student assistantships Also, a number of nearby colleges use Drew graduate students as part time lecturers in fields in which they are competent.

The Dropsie College for Hebrew and Cognate Learning

PHILADELPHIA, PENNSYLVANIA

The College was established in 1907 to promote Hebrew and cognate languages and their respective literatures and Rabbinical learning and literature without theological affiliation Emphasis is given to the training of scholars This is exclusively a graduate school

The School of Education, which awards the Ph D and the Ed D was established in 1945 to emphasize religious and ethical Jewish education The Institute for Israel and the Middle East was founded in 1948 and gives the Ph D

Men and women, Summer courses Private control 7 Ph D s awarded in 1956 7

Residence requirement for doctorate minimum of three years of graduate study, two years must be spent in residence at the College

ADMISSION REQUIREMENTS

Nonprofessional bachelor's degree or equivalent Good preliminary knowledge of the Hebrew language and its literature or alternatively of some cognate language and its literature, a knowledge of Latin, Greek, and modern languages sufficient for scholarly investigation Candidates for admission to the School of Education must have an adequate knowledge of the Hebrew language and its grammar

GRE, three letters of recommendation

FEES AND FIRST YEAR AID

Registration and library fee \$50 per semester

Student loan fund, scholarships, and fellowships Apply to Registrar, Dropsie College, Philadelphia 32, Penna

FIELDS OF STUDY FOR THE PH D

Education History of education, educational psychology, philosophy of education, curriculum development, Jewish education Prerequisites nonprofessional bachelor's degree, adequate knowledge of Bible, modern Hebrew literature, Jewish history, practical experience in Jewish school work, undergraduate instruction in education. Ed D also awarded in this field Faculty

10 full time, 8 part time 121 graduate students enrolled.

Hebrew and Semitic Studies Biblical literature, Rabbinic literature, Hebrew language and literature, cognate languages and Islamic studies, history, Jewish philosophy, Assyriology and Egyptology, comparative religion. *Prerequisites* see 'Admission Requirements supra Faculty 10 full time, 8 part time 121 graduate students enrolled.

Institute for Israel and the Middle East History, anthropology, sociology, economics political science, Middle East languages *Prerequisites* nonprofessional bachelor's degree, adequate preliminary education in the social sciences Faculty 10 full time, 8 part time 121 graduate students enrolled

Duke University

DURHAM NORTH CAROLINA

Graduate School of Arts and Sciences

The School was formally organized in 1926 Programs are administered by the Dean in collaboration with the Directors of Graduate Studies in various departments Programs leading to the Ph.D. are offered in some phases of the School of Forestry and in pre-clinical departments of the School of Medicine

School of Medicine offers M.D., School of Forestry, the Doctor of Forestry, School of Law, the S.J.D. Ed.D. is also awarded by the Graduate School.

Special library collections on selected areas of the British Commonwealth, Southern history, newspapers of the Atlantic Seaboard states, Walt Whitman, Italian and comparative literature Marine laboratory, cooperative arrangements with Oak Ridge National Laboratory, microwave and low temperature facilities, Van de Graaff accelerator, forest reserve, nuclear magnetic resonance, mass spectrometer, radio isotope and related equipment.

Residence halls for graduate men and women. Summer courses 59 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate minimum of 3 years of graduate study, at least one full year in residence at the University

ADMISSION REQUIREMENTS

Three letters of recommendation from individuals familiar with academic work, preferably two from major professors and one from minor area, evidence of ability, preparation, and motivation to do graduate work, bachelor's degree or equivalent

GRE and/or MAT required in certain departments

Broad educational base suggested

Apply between March 1 and May 15 to Dean of Graduate School of Arts and Sciences

FEES AND FIRST YEAR AID

Tuition—\$770 per academic year Room—\$175 per academic year for men, \$200 to \$250 for women Board—\$450 \$600 per year

Fellowships, scholarships, teaching and research assistantships from \$770 to \$2,500 per academic year Apply before March 1 to Dean of Graduate School of Arts and Sciences

FIELDS OF STUDY FOR THE PH.D.

Anatomy Muscle action, histochemistry, neurological control of ovulation, comparative histology, tissue culture special senses, autonomic nervous system, the hypothalamus, circulatory studies, endocrine control of reproduction *Prerequisite* equivalent of an undergraduate major in biology or zoology

Biochemistry Metabolism, nucleotide metabolism, amino acid metabolism and biological oxidations, sulphur metabolism, physical biochemistry, and mechanisms of enzyme action. *Prerequisites* undergraduate major, preferably in chemistry (physics or biology acceptable), necessary background in biological sciences

Botany Cytology, ecology, genetics, morphology, taxonomy, physiology, microbiology, mycology, bryology *Prerequisite* equivalent of a major in a biological science, work in chemistry and physics desirable

Chemistry Analytical, physical organic, polymer, fluorine, and high temperature chemistry, electrochemistry, organic synthesis, organic mechanisms, stereochemistry, molecular structure using nuclear magnetic resonance, dielectric and

infrared methods, chemical physics, and ion exchange phenomena Prerequisites a major in chemistry mathematics through calculus, related work in physics

Economics Economic theory, history of economic thought, demographic and economic thought and change, economic history, economic systems industrial and organizational economics, international trade, labor economics, mathematical and econometrical economics money and banking public finance, statistics and national income Prerequisites basic courses in economics, and (preferably) courses in mathematics, philosophy psychology, history and social sciences

English English and American literature Prerequisite undergraduate major or concentration in literature

Forestry Silvics forest soils, forest economics, properties of wood forest mensuration, forest entomology, physiology of forest trees forest pathology Prerequisite undergraduate major in one of the basic sciences and/or sufficient pre forestry course work to qualify for graduate level study in the particular area of concentration

History American Western European Renaissance and Reformation, Great Britain, Latin American American foreign relations Far East in modern period Russian and military history Prerequisites basic courses in history, broad social sciences or humanities background

Mathematics Algebra number theory topology, analysis—including partial and ordinary differential equations Prerequisite basic preparation equivalent to an undergraduate major in mathematics

Microbiology Diagnostic bacteriology and immunology, biochemistry and nutrition of microorganisms medical mycology, virology Prerequisites major in one of the biological sciences, chemistry through organic, college physics, mathematics through analytical geometry French and German adequate for reading examination for the Ph D

Philosophy History of philosophy logic, philosophy of science, epistemology, metaphysics philosophical analysis ethics, aesthetics, political philosophy, philosophy of religion and philosophy of law Prerequisite equivalent of an undergraduate major in philosophy

Physics Low temperature physics, microwave spectroscopy, optical spectroscopy, nuclear physics,

cosmic rays and high energy particles, theoretical physics Prerequisites equivalent of an undergraduate major in physics and related mathematics

Physiology Basic principles of human physiology Prerequisites one year of biology, two of chemistry, and one of physics

Political Science American government and constitutional law, comparative government (a) European institutions, (b) Far Eastern institutions, (c) Commonwealth institutions, political theory, American state and local government, international law and organization, public administration Prerequisites basic courses in political science including some work in American government Work in other social sciences desirable

Psychology General, experimental, clinical and counseling industrial, and social psychology Prerequisites major in psychology of approximately 24 semester hours is preferable but not too many more hours (experimental psychology and statistics should be included), broad background desirable in general science including mathematics biology chemistry and/or physics, work in sociology and anthropology, GRE MAT

Religion Biblical studies historical studies, systematic and contemporary studies Prerequisite generally, a B D

Romance Languages French literature, Spanish literature Prerequisites undergraduate major in one of the Romance languages, work in another Romance language is desirable, related work in literature

Sociology Anthropology community, race and culture, collective behavior, social organization and disorganization, social theory methods of social research. Prerequisite course work equivalent to an undergraduate major in the field, related social science work.

Zoology Comparative cellular, and invertebrate physiology, general experimental, and in vertebrate embryology, cytology, ecology, entomology, parasitology, limnology, vertebrate, in vertebrate and marine zoology, physiological ecology, vertebrate morphology and zoology, histology, genetics radiation biology systematics Prerequisites undergraduate major in zoology or its equivalent, one year of chemistry Recommended one year of physics

Duquesne University

PITTSBURGH, PENNSYLVANIA

The Graduate School

The Graduate School was organized as a separate administrative unit within the university in 1911. Only the masters degree was awarded until 1952, when doctoral work was begun. The school is administered by the dean, assisted by a graduate council. The purpose of the Graduate School is to provide properly qualified students with an opportunity to pursue advanced study with a view to 1, increasing and deepening their own knowledge and appreciation of a chosen area, 2, acquiring skill in the use of standard techniques of research and 3, making whatever contribution they can to the advance of human wisdom, by teaching others and/or by adding to the store of known truth and established method.

The campus is in the downtown area of Pittsburgh, one of the nation's great centers of industry and research. Limited dormitory space is available on campus but cannot be assured to graduate students.

Both men and women are admitted to all programs. Summer and evening courses are available in most departments. 5 Ph.D.s were awarded in 1956-7.

Residence requirement for doctorate: at least two consecutive semesters on campus.

ADMISSION REQUIREMENTS

Bachelor's degree with better than average attainment. Individual departments set specific requirements.

Application to be made to the Graduate Dean at least one month before registration.

FEES AND FIRST YEAR AID

Tuition \$16.00 per semester hour of credit, University fee \$12.00 per semester, library fee \$5.00 per semester, laboratory fees where applicable.

Assistantships and fellowships which provide for tuition and a monthly stipend. Application should be made to the Graduate Dean before May 1.

FIELDS OF STUDY FOR THE PH.D.

Chemistry Organic chemistry, biochemistry, physical inorganic chemistry. Prerequisites: 32 semester hours in undergraduate chemistry, together with at least one course in college physics, and mathematics through calculus. Faculty: 6 full time, 18 graduate students enrolled.

Philosophy Systematic philosophy, history of philosophy, contemporary philosophy. Prerequisites: 24 semesters in undergraduate philosophy, including logic, history of philosophy, and fundamental problems of systematic philosophy. Faculty: 7 full time, 2 part time, 8 graduate students enrolled.

Emory University

EMORY UNIVERSITY, GEORGIA

Graduate School of Arts and Sciences

The degrees of Master of Arts and Master of Science have been offered since 1919, when the Graduate School was organized as a distinct division of the University. In 1941 graduate instruction was extended to programs for the Ph.D. The first Ph.D. was awarded in 1948. Training scholars for positions of leadership, particularly in education and research, is the School's primary objective. The School is especially concerned with preparing those students who plan to teach in public and private school systems, colleges, or universities. Specific programs have been designed to provide the best possible preparation in these careers. In general, curricula and programs are designed to begin in the Fall quarter, and students are admitted in other quarters only when the department concerned can provide an adequate progression of courses, following the admission of the student.

Men and women. Summer courses. 12 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: a minimum of six full quarters beyond the master's level.

ADMISSION REQUIREMENTS

Master's degree or its equivalent. Ability to read two foreign languages for candidacy. Acceptable GRE scores.

Apply to the Dean of the Graduate School by March 1 for the following year, if financial aid is sought

FEES AND FIRST YEAR AID

Tuition—\$705 Room—\$37.50 to \$80 per quarter for both men and women. Board—approximately \$160 per quarter

Fellowships—\$1,850, \$2,000, \$2,400 Assistantships—\$1,705, \$2,100 25 fellowships of \$1,750 are awarded at the first year level on a competitive basis Apply to the Dean of the Graduate School in September and March.

FIELDS OF STUDY FOR THE PH.D.

Basic Health Sciences Anatomy, bacteriology, biochemistry, pharmacology, physiology Prerequisites master's degree or its equivalent Recommended GRE Faculty 27 full time, 17 graduate students enrolled

Biology Cytogenetics, cytology, experimental embryology (vertebrate and invertebrate), genetics, parasitology, plant ecology, protozoology, radiation biology Prerequisites master's degree or its equivalent, reading knowledge of French or German, GRE Faculty 10 full time 15 graduate students enrolled

Chemistry Analytical, organic, physical. Prerequisites master's degree or its equivalent, French or German GRE Faculty 9 full time 18 graduate students enrolled

English Prerequisites M.A. in English or the equivalent, French or German Recommended GRE Faculty 8 full time 18 graduate students enrolled

History Most phases of American, limited areas of European and English. Prerequisites master's degree or its equivalent, French, German, or Latin Recommended GRE Faculty 11 full time, 15 graduate students enrolled.

Institute of Liberal Arts Seminars on the liberal arts and studies in Western tradition, critical study of systems of knowledge Prerequisites bachelor's degree from recognized institution, year of graduate study or its equivalent, reading knowledge of two foreign languages (one modern) Faculty 19 part time, 7 graduate students enrolled

Philosophy Epistemology and metaphysics, ethics, philosophy of religion, history of philosophy Prerequisites master's degree or its equivalent,

German and French. Faculty 5 full time, 10 graduate students enrolled.

Political Science State and local government, public administration, comparative government, international relations Prerequisites master's degree or its equivalent Faculty 6 full time, 9 graduate students enrolled.

Psychology General psychology Prerequisites master's degree or its equivalent, GRE, including advanced test in psychology Faculty 10 full time 17 graduate students enrolled.

NOTES

Teaching fellowships and assistantships are granted to encourage and stimulate superior and outstanding students at the graduate level and to give them an opportunity to obtain teaching experience

Florida State University

TALLAHASSEE, FLORIDA

The Graduate School

University established in 1947 as the successor to Florida State College for Women, 1905-1947, latter succeeded colleges in continuous operation on the present site since 1857 Graduate instruction offered by the University in The Graduate School utilizes the faculty and facilities of the College of Arts and Sciences and the Schools of Education, Home Economics, Music, Library, Journalism, Business, Public Administration, and Social Welfare. The Graduate Program is under the control of the Graduate Council

A nursery school, kindergarten, and University school with grades 1 through 12 for observation and practice, marine laboratory on Gulf coast 30 miles away, new library, statistical laboratory University is a sponsoring member of Oak Ridge Institute of Nuclear Studies Dormitories for men and women, and limited number of apartments and residences for married students.

Men and women. Summer and evening courses 23 Ph.D.s awarded in 1956-7

Three years of residence after the bachelor's degree is required for doctorate.

ADMISSION REQUIREMENTS

Bachelor's degree from accredited institution
MAT, or Aptitude Test of GRE

Apply to University Admissions Office six weeks prior to registration, for foreign students, three months or longer

FEES AND FIRST YEAR AID

Tuition—in state \$75 per semester, out of state \$250 Room—men \$90 to \$105, women \$90 to \$135 Cafeteria

Limited number of graduate fellowships available with stipends of \$600-\$1,200 for an academic year, waiver of out of state tuition

Graduate assistantships with maximum stipend of \$1,800 for academic year for half time service, other stipends for other amounts of service, assistantships carry waiver of out of state tuition

Apply to Dean of The Graduate School, preferably before February 15

FIELDS OF STUDY FOR THE PH D

Botany Bryology, mycology, physiology, morphology of vascular plants, physiology taxonomy Biological Sciences and the Oceanographic Institute offer degree in biological oceanography Combined program for major or minor among divisions of the department Prerequisites undergraduate major in the area of concentration in the department. Program administered by Biological Sciences Dept Faculty 7 full time 10 graduate students enrolled

Chemistry Inorganic, analytical, nuclear, organic, physical, and radiation chemistry, biochemistry and chemical spectroscopy Prerequisites one year course in each of the following—general inorganic, analytical, organic and physical chemistry, calculus physics, reading knowledge of German and Russian or French, recommendations from chemistry teachers and adequate scholastic achievements Recommended ACS approved bachelor's degree, differential equations Faculty 16 full time, 1 part time 60 graduate students enrolled

Education School administration and organization, evaluation measurement, and statistics, guidance for school personnel, history of education, elementary and early childhood education, secondary education, supervision and curriculum development, adult education philosophy of education, teacher education, trade and industrial education, junior college education, child development D Ed also awarded in this field Faculty 36 full time

English Combined program with humanities Prerequisites bachelor's degree, with an English major or approximate equivalent (in exceptional instances applicants may be admitted despite deficiencies, but must overcome them) Faculty 24 full time, 19 part time 27 graduate students enrolled

Government American government, public administration, political theory, comparative government and international relations Department of Political Science and School of Public Administration offer a joint doctoral program in government Faculty 11 full time 19 graduate students enrolled

Home Economics Child development, clothing and textiles—family economics, food and nutrition, home and family life institution administration, home economics education, general home economics, related art—clothing and textiles Combined program interdivisional marriage and family living Prerequisites undergraduate major in the areas of concentration, or in closely related areas satisfactory to the major professor Faculty 26 full time 28 graduate students enrolled

Humanities An interdivisional program in humanities, with contributions from music, art, classics, English, history, modern languages, philosophy, and speech Program administered by Interdivisional Committee

Inter divisional (Departments of Education, Home and Family Life, Psychology, Social Welfare, and Sociology) Areas of concentration are teaching, research marriage counseling family counseling. Combined program with marriage and family living Prerequisites undergraduate major in one of the participating departments Ed D in education and in social welfare also awarded. Program administered by an Interdivisional Committee Faculty 12 full time, 11 graduate students enrolled

Meteorology Synoptic meteorology, theoretical meteorology, tropical meteorology, dynamic climatology Prerequisites bachelor's degree, including at least one year of calculus and one year of university level physics, German, plus Russian or French Recommended emphasis on mathematics, physics, or meteorology in prior

education Faculty 7 full time, 1 part time 39 graduate students enrolled

Modern Languages Doctoral major, Spanish, doctoral minor, French, philology, medieval, Renaissance, Golden Age, 18th, 19th, and 20th century, Latin American. Prerequisites undergraduate major or minor, or knowledge equivalent in Spanish and French, plus (normally) the M.A. in Spanish or French Recommended reading knowledge of Latin and German, foreign travel or study in Spanish speaking country, teaching or research experience Faculty 8 full time 22 graduate students enrolled.

Music Music education, music theory, piano literature Tests Music GRE in theory, history and literature, applied music Doctor of Music, with a concentration in piano literature, also awarded Faculty 37 full time, 1 part time, 15 teaching graduate assistants 50 graduate students enrolled

Oceanographic Institute Biological oceanography Combined programs with Departments of Biology, Chemistry, and Meteorology Prerequisites acceptable work in same or allied science at BS and MS level, with major in biology, physics or chemistry Recommended courses in sciences allied to major, biology, chemistry up to organic, physics, geology, mathematics at least through algebra and trigonometry Faculty 4 full time 15 graduate students enrolled

Physics Theoretical nuclear physics, experimental nuclear physics X rays, theoretical molecular structure, nuclear magnetic resonance field theory, mathematical methods Prerequisites intermediate heat, light, electricity, mechanics, and modern physics, differential calculus, BS in physics Faculty 8 full time 9 graduate students enrolled

Physiology Biophysics, general, mammalian, invertebrate comparative sensory neurophysiology endocrinology Department of Biological Sciences and the Oceanographic Institute offer degree in biological oceanography Combined program for major or minor between divisions of this Department Prerequisites undergraduate major in the area of concentration in the Department Program administered by Biological Sciences Department Faculty 4 full time 11 graduate students enrolled

Psychology General general experimental, clinical, child clinical, counseling, industrial Combined programs with Home and Family Life

in psychology, sociology, education, home economics, social welfare Prerequisites no required courses, prefer the student to have general, advanced general, experimental, and good mathematics background Recommended in some cases Spanish in the place of German or French Faculty 12 full time 71 graduate students enrolled

Sociology Social institutions population and human ecology social psychology Combined program with marriage and family living Faculty 7 full time 8 graduate students enrolled.

Speech Public address, theatre, speech correction and audiology, radio television, teacher training Prerequisites phonetics, speech pathology, oral interpretation, foundations of public speaking discussion and debate, evaluation of potential by Department Recommended broad preparation in the liberal arts and speech. Faculty 14 full time, 9 part time, 25 graduate students enrolled

Zoology Parasitology, experimental embryology, ichthyology genetics invertebrate morphology, and taxonomy, also ornithology Department of Biological Sciences and the Oceanographic Institute offer degree in biological oceanography Combined program for major or minor between divisions of the Department. Prerequisites undergraduate major in the area of concentration in the Department and admission requirements of The Graduate School. Program administered by Biological Sciences Faculty 7 full time 9 graduate students enrolled

University of Florida

GAINESVILLE, FLORIDA

The Graduate School

Graduate education dates from the establishment of the University at Gainesville in 1905 The first master's degree was awarded in 1908, the Ph.D. in 1934 Enrollment in 1957 was 779 men and 313 women An autonomous unit, the Graduate School is governed by a Dean, a Graduate Council of ten members, and a graduate faculty

Extensive library collection of Florida history, agricultural experiment station with more than 10,000 acres of land, seven field laboratories, nine

branch stations, and special facilities in sub-tropical agriculture, engineering and industrial experiment station with over three million dollars worth of equipment, complete pulp and paper laboratory, sub-critical nuclear reactor, training nuclear reactor, radiation laboratory with Cobalt 60 radiation source, special chemical laboratories for research in naval stores, fluorine chemicals, hydrazine and boron derivatives, water analysis, and anodic polarography

Also cancer research laboratory, North American Philips electron microscope, 1 million volt Van de Graaff positive ion accelerator, museum with strong collections in ornithology and Florida archaeology, facilities for research in marine biology at Sea Horse Key

Cooperation with research laboratory at Moosheaven Home for the Aged, Oak Ridge Institute (a member), Yerkes Laboratory of Primate Biology, and Florida State Farm Colony, radio stations, annual institute of gerontology, IBM 650 electronic computer

The Colleges of Agriculture, Arts and Sciences, Business Administration, Engineering, Medicine, and Pharmacy offer the Ph.D. The College of Education, the Ed.D.

Men and women Summer courses 32 Ph.D.s awarded in 1956-7

Residence requirement for doctorate three years beyond the bachelor's degree, at least one year (either the second or third) must be spent in full time study at the University. In meeting this requirement, part time study may be substituted for full time study in either of the following proportions: (a) 30 semester hours in a calendar year, or (b) 35 semester hours in four successive registrations (either including or excluding summer session registration)

Up to two years' residence in approved graduate schools may be applied toward the doctorate if recommended by the student's supervisory committee and the Graduate Council

ADMISSION REQUIREMENTS

Admission is granted by the Director of Admissions with the approval of the graduate selection committees of the various colleges and divisions.

Minimum undergraduate average must be (1) in most branches of the University, 3.0 (B) during the junior and senior years, (2) in the College of Education, 2.5

Students planning to undertake graduate work are strongly advised to anticipate the language requirement of the degree in which they are interested. Failure to do so may result in prolonging the time required for the degree. Normally, French and German are required for admission to candidacy to the Ph.D.

GRE Applicants are required to present satisfactory scores on the aptitude test of this examination, they are encouraged but not required to present scores on the advanced test

Individual departments may have special requirements, consult the head

File application with the Director of Admissions, University of Florida, at least six weeks prior to beginning of term.

FEES AND AID

Tuition—In state, \$75 per semester, \$45 per 8 week summer term, out-of state, \$250 and \$145 for summer Room—\$55 \$90 per semester in University residence halls, \$20 \$30 per month off campus Board—\$65 per month average

Fellowships at \$1,125 and \$1,375 for nine months—requiring no service and providing a full year of residence, tuition scholarships for out of state students, one third time assistantships—requiring 15 hours' service per week, at \$1,400 for nine months or \$1,711 for eleven months, one half time assistantships, requiring 20 hours' service per week, at \$1,900 for nine months, or \$2,322 for eleven months

Apply by March 1 to head of major department. Assistantship applications should be filed as early as possible to receive the most favorable consideration

FIELDS OF STUDY FOR THE PH.D.

(Only members of the Graduate Faculty are listed)

Agricultural Economics Agricultural marketing, production economics and farm management, land economics, prices and statistics. Prerequisites: an undergraduate major in agricultural economics, or equivalent, master's degree in field, or equivalent. French and German (with option to substitute a study of advanced mathematics for one language) are required for admission to candidacy. Faculty 13 part time. 7 graduate students enrolled

Agromony Crop production, genetics and plant breeding, weed control. Prerequisites: an undergraduate major in agronomy, or equivalent

lent, master's in agronomy, or equivalent, a minimum of 20 semester hours in agronomy Faculty 1 full time, 13 part time 14 graduate students enrolled

Animal Husbandry Animal nutrition, meats, animal breeding, and physiology Prerequisites an undergraduate major in animal husbandry or related fields, MSc in animal husbandry, or equivalent (6 hours of basic courses in general chemistry and 3 hours of agricultural chemistry), adequate background in basic and applied science, letters of recommendation Recommended 6 hours in organic chemistry, 3 in elementary nutrition 8 of general and qualitative chemistry Faculty 10 full time 26 graduate students enrolled

Bacteriology General, physiology, pathogenic, and immunology There is an informal joint program with the Department of Microbiology, College of Medicine Prerequisites undergraduate major in bacteriology or biology, chemistry, including general, qualitative, quantitative analysis, organic, one year each of college mathematics and physics, master's degree in bacteriology, or equivalent, German and French for admission to candidacy Recommended biochemistry Faculty 7 full time, 1 part time 9 graduate students enrolled

Biology (Zoology) Zoology—ecology, systematics, physiology morphology, paleontology, marine biology, limnology, experimental embryology, protozoology, herpetology Prerequisites undergraduate major in zoology (30 hours), master's degree in biology or equivalent Faculty 15 full time, 5 part time 27 graduate students enrolled

Cancer Research Biology and biochemistry, biochemistry and chemistry, mathematics, bio physics, and physical chemistry Prerequisites an undergraduate major in the basic sciences, master's degree, or equivalent, also usually required, organic chemistry, biochemistry Recommended physiology, biology, histology, physics, bacteriology, pathology, comparative anatomy, genetics Faculty 3 full time 3 graduate students enrolled

Chemical Engineering Unit operations, thermodynamics, radiochemical processes, kinetics, pulp and paper, fused salt electrochemistry, economics, fluorine derivatives, plastics, paints, macromolecular materials, filtration, diffusional operations, catalysis Prerequisites BS in chemical

engineering Faculty 17 full time 17 graduate students enrolled

Chemistry Physical, organic, inorganic, analytical, and flourine chemistry, biochemistry A minor outside the department is required Prerequisites undergraduate major in chemistry, including organic and physical chemistry (in some instances deficiencies can be made up here), the master's in chemistry, or equivalent, is usually required, letters of recommendation in some instances Faculty 16 full time 64 graduate students enrolled

Civil Engineering (1) Sanitary Engineering water supply and wastes engineering, sanitary engineering design, environmental sanitation, air pollution, radiological health, (2) Structural engineering structural, theory analysis and design For sanitary engineering, minor work may be in mathematics, chemistry, bacteriology, nuclear engineering, or chemical engineering (Latter two minors must be combined with minor in basic science) For structural engineering, minor work in engineering mechanics and mathematics Prerequisites undergraduate major in civil engineering, or equivalent, master's degree in civil engineering, or equivalent A knowledge of basic undergraduate courses in sanitary engineering subjects would be an advantage Recommended for sanitary engineering experience following the baccalaureate degree, for structural engineering, industrial experience Faculty 14 full time 7 graduate students enrolled

Economics Economic theory, foreign trade, labor, public finance, transportation, and statistics Combined program with accounting business or organization and operation, and real estate Prerequisites bachelor's degree, with major in economics or business administration Ph D in agricultural economics also awarded by the College of Agriculture Faculty 19 full time 19 graduate students enrolled

Economics and Business Administration Accounting, business organization and operation, including finance, marketing, management, insurance, real estate Combined program with economics is offered Prerequisites depending upon the concentration, undergraduate degree with major in accounting, business organization and operation, economics or real estate, a study of mathematics may be substituted for one foreign language Faculty 24 full time 27 graduate students enrolled

Education Ed.D offered with emphasis on educational administration, curriculum and in structure and foundations of education.

Electrical Engineering Applied electronics and control systems (including computer and switching circuits), circuit analysis and network theory electromagnetic fields and waves, high frequency systems and components (including radar, TV and microwave tubes), communication theory and noise studies, meteorological instrumentation nuclear engineering instrumentation electrical machinery, and power systems Normally the student takes one or two minors among mathematics physics, and other branches of engineering. He may take program with equal emphasis on the major and one minor subject Prerequisites bachelor's degree in electrical engineering (outstanding students in physics mathematics and other branches of engineering are admitted but are required to make up deficiencies), good scholastic performance Recommended advance mathematical subjects Faculty 12 full time 32 graduate students enrolled

English Medieval literature the Renaissance the Restoration and 18th century 19th century American literature English linguistics Composite minors are offered in American studies humanities language arts comparative literature and comparative linguistics Prerequisites undergraduate major in English or equivalent master's degree in English or equivalent (quantitative deficiencies may be made up) Direct correspondence or personal interview is desirable An elementary knowledge of Latin or Greek is required for the degree Faculty 31 full time 57 graduate students enrolled

Fruit Crops Nutrition physiology and plant breeding as related to citrus and other subtropical and deciduous fruits Production management and packing house management as related to citrus and other fruit crops Minors are preferred in botany soils plant pathology entomology Prerequisites BS with adequate background in botany and chemistry (students without basic course background may take background courses preliminary to entering graduate school) Personal interview preferred when possible recommendations from three responsible workers in major or related fields who are familiar with the applicant Recommended students with M.S., or at least two years' experience in the field of major interest this varies to some extent depending

upon qualification and ability of applicant Faculty 10 full time 7 graduate students enrolled

Geography Economic and political, Latin American geography Prerequisites undergraduate major in geography or in the social or physical sciences but nongeography major must complete master's degree in geography, letters of recommendation, detailed statement from applicant concerning his interests Personal interview desirable Students are discouraged from taking work on all three levels in the department Faculty 4 full time, 1 part time 7 graduate students enrolled

History United States Southern, Latin American, and Caribbean A program in Latin American area studies is offered with the School of Inter American Studies Prerequisites undergraduate major with a minimum of 24 hours in history or 36 hours in social sciences (18 in history), master's, or equivalent, in history, letter of recommendation Faculty 15 full time 22 graduate students enrolled

Inter American Studies Sociology, geography history political science economics and business administration, education, Spanish The doctoral program is tailored to suit individual student needs Besides the area concentration, three supporting fields are selected for each student Prerequisites required courses and advanced courses are determined for each student Travel in Latin America is desirable Faculty 17 full time 7 graduate students enrolled

Mathematics Statistics theory of elasticity, hydrodynamics viscosity geometry, algebra, analysis, history of mathematics Prerequisites an undergraduate major in mathematics, with grades half way between B and A, or better, usually a master's in mathematics, or equivalent, satisfactory references Faculty 18 full time 25 graduate students enrolled

Medicine Anatomy, biochemistry, microbiology, and physiology Joint program with Department of Bacteriology College of Agriculture Prerequisites for anatomy—general zoology, comparative anatomy embryology or genetics, general chemistry organic chemistry, general physics and one modern language, for biochemistry—general, organic, physical chemistry, qualitative and quantitative analysis, general biology and physics calculus and German, for microbiology—2 years biology, chemistry, 1 year physics physical chemistry desirable, mathematics

(basic), for physiology—no fixed prerequisites Recommended for biochemistry—advanced organic chemistry, microbiology, general or human physiology, advanced physical chemistry (physical organic, kinetics, or thermodynamics), for microbiology—basic bacteriology, physical chemistry, for physiology—a major in biology, chemistry, engineering physics, or mathematics Faculty 8 full time 4 graduate students enrolled

Pharmaceutical Chemistry Synthetic drugs, ultrasonic wave action on drug extractions and natural polymers, synthesis of surface acting agents from triterpenoid saponins Prerequisites graduation from an accredited college of pharmacy, scholastic average of B or higher in all chemical work taken on the undergraduate level Faculty 2 full time, 1 part time 8 graduate students enrolled

Pharmacognosy Prerequisites graduation from accredited college of pharmacy 8 hours of physics, 6 8 hours of mathematics, 20 hours of chemistry, unless the student has a degree in pharmacy Faculty 1 full time, 1 part time 2 graduate students enrolled

Pharmacology Prerequisites graduation from an accredited college of pharmacy, 8 hours of physics, 6 8 hours of mathematics, 20 hours of chemistry, unless the student has a degree in pharmacy Faculty 2 full time, 1 part time 2 graduate students enrolled

Pharmacy Parenteral solutions manufacturing pharmacy, antiseptic value of medicaments Prerequisites graduation from an accredited college of pharmacy Faculty 2 full time 9 graduate students enrolled

Physics Nuclear physics (theoretical and experimental), solid state, discharge through gases, electronics, radio astronomy Prerequisites undergraduate major in physics, M S in physics before proceeding to Ph D Student should have a B+ average in course work Faculty 10 full time 22 graduate students enrolled

Plant Pathology Plant viruses nematology plant pathology Prerequisites undergraduate major in plant pathology, or equivalent, master's in plant pathology, or equivalent Faculty 2 full time, 9 part time 12 graduate students enrolled

Political Science International relations, American government public administration, international law, political theory, comparative government, public law Combined program with the School of Inter American Studies Prerequi-

sites undergraduate major, or 18 hours, plus other credits in social sciences, master's in political science, or equivalent Faculty 11 full time 21 graduate students enrolled

Psychology Experimental, clinical, and counseling psychology Each major in psychology must minor in another department Prerequisites undergraduate major in psychology, master's in psychology, or equivalent, MAT Recommended 1 year of each of four of the following—physics, chemistry, biology, mathematics, philosophy, sociology Faculty 13 full time 53 graduate students enrolled

Sociology (Latin America) A minor is required in other social sciences in courses related to Latin America Recommended a period of residence and study in a Latin American country is normally expected of doctoral candidates Faculty 7 full time, 1 part time 10 graduate students enrolled

Soils Soil microbiology (nematology), soil genesis and morphology, soil fertility Prerequisites bachelor's degree from a recognized college of agriculture, with a major in soils, or the equivalent in other sciences Recommended courses in biometry, physical chemistry, advanced bacteriology Faculty 3 full time, 12 part time 6 graduate students enrolled

Spanish Prerequisites 30 semester hours of undergraduate courses, which must include 6 hours of composition conversation, 12 of literature and 6 of introduction to the study of philosophy, reading knowledge of Latin, German, and a major Romance language other than Spanish Faculty 3 full time 4 graduate students enrolled

Speech Public address, theatre, correction and audiology Prerequisites undergraduate major in speech, or equivalent Faculty 8 full time 25 graduate students enrolled

Vegetable Crops Vegetable production. Prerequisites completion of an undergraduate program in horticulture or vegetable crops, including 20 hours of horticulture Courses in basic sciences may be substituted in part for courses in horticulture Faculty 1 full time, 4 part time 4 graduate students enrolled

NOTES

Several departments provide an opportunity for practice teaching under supervision and formal instruction and counseling in the teaching of

their subjects on the college level Courses in junior college teaching and curriculum planning are offered in the College of Education

Fordham University

NEW YORK 58, NEW YORK

Graduate School of Arts and Sciences

Established 1916 A Catholic university under the auspices of the Jesuits Admits men and women for the M A and Ph D degrees in eleven major fields biology, chemistry, classical languages and literatures, English language and literature, history, mathematics, philosophy, physics, political philosophy and the social sciences, psychology, Romance languages and literatures Its chief purpose is the training of scholars, research workers, and teachers

School of Education offers Ph D and Ed D

Facilities of New York Botanical Garden adjoining the campus are available for advanced students in botany Special research facilities for advanced work in proteins and polymers Fully equipped Seismic station is maintained Laboratories in psychology include a complete set of IBM tabulating and listing machines for dealing with mass data Biology Dept. maintains facilities at Marine Biological Laboratory Woods Hole, Mass

Campus residence facilities available for male students

Summer courses 55 Ph D s awarded 1956 7

Residence requirements for doctorate two years

ADMISSION REQUIREMENTS

Bachelor's degree, two letters of recommendation. Students selected by departments on basis of record, qualifications for independent work.

German and French Substitution of another language allowed where subject matter of research demands it

Recommended GRE, MAT, Latin sight translation for classics

Apply to Director of Admissions, Graduate School, prior to September 1 and January 15

FEEs AND FIRST-YEAR AID

Tuition—\$300 each semester and \$5 registration, science students \$600 \$750 Rooms—Men \$770 on campus

A number of scholarships and assistantships Special loans Possibilities of campus work Apply to Student Aid Committee at time of registration or shortly after arrival on campus

FIELDS OF STUDY FOR THE PH D

Biology Cytology, entomology, experimental embryology, physiology Special opportunities in botany Prerequisites general biology, comparative anatomy, histology, embryology, general and organic chemistry, general physics Faculty 8 full time 54 graduate students enrolled

Chemistry Analytical, inorganic, organic, physical, biochemistry Prerequisites inorganic, analytical, organic, physical One year of general physics Mathematics, including differential and integral calculus Biological sciences for those desiring biochemistry Faculty 11 full time, 3 part time 46 graduate students enrolled

Classics Roman comedy, Latin medieval and patristic, Latin and Greek philology Prerequisites minimum of 24 semester hours in classical languages and literature, sight reading test early in first semester Faculty 8 full time, 1 part time 24 graduate students enrolled

English English literature 1485 present, American literature Prerequisites minimum of 24 semester hours of undergraduate study in English language and literature Faculty 8 full time, 1 part time 106 graduate students enrolled

History Early Christian and medieval, modern European American Prerequisites minimum of 24 semester hours of undergraduate history Faculty 9 full time, 1 part time 78 graduate students enrolled

Philosophy Greek philosophy, medieval philosophy, modern philosophy Stress is placed on individual philosophers and their works Prerequisites sufficient background in scholastic philosophy and a minimum of 24 semester hours of undergraduate philosophy Certain fields require a reading knowledge of Latin and Greek Faculty 10 full time, 1 part time 84 graduate students enrolled

Physics Theoretical, spectroscopy, nuclear Prerequisites general physics, general chemistry, advanced algebra, analytic geometry, differential

and integral calculus Faculty 7 full time. 11 graduate students enrolled

Political Philosophy and Social Science Economics, government, international relations, sociology political theory Prerequisites minimum of 24 semester hours in either economics, sociology, or government Faculty 18 full time 78 graduate students enrolled

Psychology Experimental, clinical, psychometrics Prerequisites minimum of 18 semester hours of undergraduate psychology, including a course and laboratory in experimental Recommended MAT Faculty 10 full time, 3 part time 90 graduate students enrolled

Romance Language French (only), (Spanish only M A), 17th, 18th, 19th, 20th century medieval literature, Romance philology Prerequisites minimum 18 semester hours of undergraduate studies in language and literature Spanish and Italian, writing and speaking knowledge of the language of major field Faculty 7 full time 45 graduate students enrolled

George Peabody College for Teachers

NASHVILLE, TENNESSEE

The Graduate School

In 1875 the former University of Nashville, which had its origin in 1785, became George Peabody College for Teachers. It is a private and independent institution with no state or denominational support or connection.

Dormitories for graduate men and women apartment units for married students with children. A child study center, speech and hearing center, campus laboratory schools, center for advanced training of teachers for the blind, overseas international educational project (Korea), children's library, textbook collection, art museum, summer cultural program of night ly concerts and lectures.

Men and women Summer, Saturday, and evening courses 36 Ph D's and Ed D's awarded in 1956-7.

Residence requirement for doctorate 9 quarters beyond the bachelor's degree (an additional

year for internship required in psychology), 3 beyond the master's, and 2 following the passing of comprehensive examinations.

Up to 6 quarter hours may be transferred to apply on master's, up to 72 on doctorate.

ADMISSION REQUIREMENTS

Bachelor's degree Departmental screening of doctoral candidates

Apply to Director of Admissions at any time

FEES AND FIRST YEAR AID

Tuition—\$10 per quarter hour of credit Room—men \$40 to \$65 per quarter, women \$42 to \$75 Board—average \$2 per day in campus cafeterias

Stipends of scholarships and fellowships range from \$300 to \$1,000 at the master's level, stipends for doctoral students range up to \$2,500 for assistantships. Apply to chairman of scholarship committee, or to the chairman of the major departments in the case of assistantships, prior to February 15 for the ensuing year.

FIELDS OF STUDY FOR THE PH D

Education Elementary education, secondary education, educational administration (with emphasis at three levels), social foundations of education, curriculum, and teaching Prerequisites master's degree, including 24 quarter hours of graduate credit in the major area, two foreign languages, usually French and German, two years of teaching or other appropriate educational experience. Ed D also offered in this field. Program administered by the Department of Curriculum, Supervision, Teaching, the Division of Educational Administration and Community Development, and the Division of Social Foundations of Education Faculty 32 full time, 8 part time 2,143 graduate students enrolled.

English Teaching of English, English and American literature Prerequisites master's degree, including 24 quarter hours of graduate credit in the major area, two foreign languages, usually French and German, two years of successful teaching experience Faculty 6 full time, 4 part time 172 graduate students enrolled.

History Prerequisites master's degree, including 24 quarter hours of graduate credit in the major area, two foreign languages, usually French and German, two years of appropriate

experience Faculty 4 full time, 1 part time 86 graduate students enrolled

Mathematics Teaching of mathematics Prerequisites master's degree, including 24 quarter hours of graduate credit in the major area, two foreign languages, usually French and German Recommended two years of appropriate experience Faculty 2 full time, 2 part time—supplemented by mathematics professors of Vanderbilt University 86 graduate students enrolled

Music Music education, musicology Prerequisites master's degree, including 24 quarter hours of graduate credit in the major area, two foreign languages, usually French and German, two years of appropriate experience Ed D also awarded in this field Faculty 14 full time; 8 part time 214 graduate students enrolled

Psychology School psychology, educational psychology and measurement, counseling psychology, mental deficiency Prerequisite bachelor's degree, MAT or GRE, two foreign languages, usually French and German, one year of internship Recommended two years of appropriate experience Program administered by the Division of Human Development and Guidance Faculty 10 full time, 2 part time 172 graduate students enrolled

NOTES

The total Peabody program is devoted to giving the college teacher in training the necessary content, professional background, and skills In order to achieve this end, no single set of courses is uniformly required.

George Washington University

WASHINGTON 6, D C

The Graduate Council

The Graduate Council, which offers only the Ph.D., was organized in 1930 to replace the Graduate School, founded in 1893 The Ph.D. program is limited and is restricted to those fields in which there are unusual research resources available in Washington. In addition to members of the University faculty, the Council includes in its research supervision program

many of the scholars and specialists of the public or private research institutions of Washington

Each doctoral student has his own individual consultative committee and research supervisor His program, set up by the committee, may move freely across administrative lines dividing departments of instructions or fields of study The department as such does not control the student's program or research project, the student's committee and research supervisor do The student is not required to register in courses, course credits are not applicable on the doctoral level A written examination on the fields of study assigned, covering a week or more, satisfies the first phase of the discipline, after which the student becomes a Fellow of the Council and works on his research project.

During the year the Council holds open meetings at which individual research problems are presented and discussed, with Fellows reporting on their particular investigations and receiving suggestions and criticism of other members

Allied divisions offering other doctoral degrees are School of Education, Ed D, School of Government, D.B.A., School of Medicine, M.D., Law School, J.D., S.J.D.

Summer and part time (evening) study may be undertaken, but courses as such for the Ph.D. are not required Men and women admitted. 27 Ph.D.'s awarded in 1956-7

There is no formal minimum residence requirement for the doctorate, but the maximum residence is limited to five years (unless extended by special action)

Enrollment is restricted by the research supervisor in as many students as he personally wishes to care for

Because the master's degree is required for admission, there is no "advanced standing" for transfer students

ADMISSION REQUIREMENTS

Acceptable bachelor's and master's degrees, or equivalent, in the same general field in which the doctor's is given.

French and German in all fields, without exception or substitution, one of which must be passed before admission. Additional languages may be required by the student's committee in certain fields.

"Tool" subjects and tests may be required in

certain fields by the student's committee

Admission may be arranged at any time since there are no courses or course credits. Apply to the Dean of the Graduate Council.

FEEs AND FIRST YEAR AID

Tuition—\$540 for each half of the total program

Teaching fellowships are available in most fields at \$1,350, plus tuition. Apply between February 1 and March 31 to the Executive Officer of the department of instruction.

FIELDS OF STUDY FOR THE PH.D.

The fields of research listed below have been authorized by the Graduate Council as those in which doctoral investigations and dissertations may be undertaken. The supporting fields of study required of all candidates for the Ph.D. are specified for each individual student by his consultative committee before admission to study under the Council. The list is subject to constant change as the educational resources of the University may direct.

Anatomy—gross anatomy, histology

Bacteriology Antibiotics, bacterial physiology and nutrition, coliform bacteria and antibiosis, immunity in tuberculosis, intestinal microbiology, immunology, antigenic analysis, virology

Biochemistry Amino acid metabolism, animal nutrition, biochemical detoxication, carbohydrate metabolism, nutrition (emphasis on vitamins), pathological chemistry, lipids, tissue respiration

Biology Cytology

Botany Taxonomy

Chemistry Analytical, inorganic, organic, physical organic, reaction mechanisms, physical kinetics and electrochemistry, physical solubilities

Economics Economic theory, planning and fluctuations, history of economic thought, international economics, international finance, national income, public finance, transportation

Geography Area synthesis

History European diplomatic since 1815, the modern Near East, nationalism, Russian and Soviet, Latin American, United States diplomatic, political, social, and economic

Languages and Literatures American literary nationalism, English sixteenth century drama, 17th century drama, Romance modern Spanish literature, Romance linguistics, old and middle

French, old Spanish, 16th century French literature, 17th century French literature, modern French literature

Law Jurisprudence

Mathematics Algebra, finite groups, analysis, infinite series, differential geometry

Pharmacology Chemotherapy, drug metabolism, medicinal chemistry, nucleoprotein metabolism in microbiological systems

Physics Electron optics, experimental nuclear physics (radioactivity), theoretical aerodynamics

Physiology Blood pressure studies, neuro-muscular studies, cardiovascular shock, endocrinology, hemodynamics

Political Science International comparative government and political theory, international law, war and neutrality, arbitration, United States the legislative process, governmental organization and administration

Psychiatry Problems of treatment (M.D. required for admission)

Psychology Counseling and guidance, military counseling and guidance, personal psychology, psychological measurements, abnormal psychology, social psychology

Statistics Multivariate analysis, theoretical probability and sampling, applied econometrics

Zoology Parasitology, parasitic protozoa, vertebrate embryology and morphogenesis, vertebrate ichthyology

NOTES

Holders of teaching fellowships are supervised by senior professors.

Georgetown University

WASHINGTON, D. C.

Graduate School of Arts and Sciences

Georgetown was founded in 1789. The first M.A. was granted in 1821, the first Ph.D. in 1897. It is operated by priests of the Roman Catholic order, the Society of Jesus (Jesuits).

The Medical School and the Dental School offer the Ph.D. in the Medical and Dental Sciences under the administration of the Graduate

School The Law School offers doctoral work (L.C.D., S.J.D.) independently

Astronomical and seismological observatories, chemo medical research institute, medical and law centers, institute of languages and linguistics

Men and women Summer and evening courses 29 Ph.D.s awarded in 1956-7

Residence requirement for doctorate two years of residence beyond the master's degree all work for the doctorate must be completed within five years

Transfer of credit in satisfaction of course requirements is allowed to a limited extent but only after the completion of a semester of work at Georgetown

ADMISSION REQUIREMENTS

Bachelor's degree with 18 to 24 credits in the field of graduate study, a B average, three recommendations

Candidate must pass reading examinations in two foreign languages, normally French and German

It is recommended that the student have an undergraduate major in the field selected.

Apply to the Registrar prior to September 1

FEES AND FIRST YEAR AID

Tuition—\$240 per semester

Assistantships scholarships and fellowships, ranging in value from remission of tuition only to remission plus a \$2,400 yearly stipend

Apply to the Registrar prior to February 15

FIELDS OF STUDY FOR THE PH.D.

Astronomy Certain courses at the Bureau of Standards or the Naval Research Laboratory are acceptable Prerequisites undergraduate course in astronomy, physics and mathematics through calculus. Faculty 3 full time, 3 part time 19 graduate students enrolled

Chemistry Biochemistry Prerequisites calculus and physical chemistry Faculty 4 full time 6 part time 116 graduate students enrolled

Economics Prerequisites 18 to 24 credit hours in undergraduate economics Faculty 10 full time, 1 part time. 59 graduate students enrolled.

Government (International Relations) Prerequisites 18 to 24 undergraduate credits in government, including comparative government, in

international relations and law, political science Faculty 7 full time, 2 part time 161 graduate students enrolled

Government (Political Science) Prerequisites 18 to 24 undergraduate credits in political science Faculty 7 full time 2 part time 150 graduate students enrolled.

History United States Europe (medieval and modern) Near and Far East, Latin America, Russia Prerequisites 18 to 24 undergraduate credits in the area selected Faculty 16 full time, 1 part time 138 graduate students enrolled

Philosophy Prerequisites 18 to 24 undergraduate credits in philosophy Faculty 6 full time 24 graduate students enrolled

Physics Prerequisites 18 to 24 undergraduate credits in physics, mathematics through calculus Recommended differential equations Faculty 4 full time, 1 part time 16 graduate students enrolled

Georgia Institute of Technology

ATLANTA, GEORGIA

Graduate Division

In 1922 the Board of Trustees authorized curricula leading to the master's degree, and the first were awarded in 1925 In 1934 the State Engineering Experiment Station was organized, and the Graduate Division in 1941 Four years later the Georgia Tech Research Institute was incorporated to implement the Station's facilities A year later the Ph.D. was authorized

Among the 40 laboratories are aeronautical industrial design colloids micromeritics applied chemical research, spectrographic, molecular spectra, catalytic hydrogenation, fibres research industrial electronics and servomechanisms, frequency control, radioisotopes communications systems industrial engineering physical properties and cryogenics sanitary engineering, hydraulics, highway engineering, communications antenna and propagation, radar electronics, soil mechanics and foundations, building materials and masonry structural research electromagnetic testing, A.C. network calculator communications and electronic research, transistor, research engine, experimental stress analysis electronic com

puter, analog computer, noise and vibrations, X ray research, mechanical engineering research, solid state physics, electron microscopy and optics nuclear measurements, microwave spectroscopy, nuclear spectroscopy, bio engineering

Women admitted only to engineering science, architecture, and city planning Summer and limited number of evening courses State institution under direct control of the Graduate Council and Dean 9 Ph D s awarded in 1956 7

Residence requirement for doctorate at least three consecutive quarters must be spent in residence at the Institute

ADMISSION REQUIREMENTS

Scholastic standing in the upper 25 per cent of college graduating class, very good references, and preferably a record showing some indication of creative abilities

Some modification in 25 per cent may be made for demonstrated excellence in master's work Complete undergraduate background in field to be studied

GRE suggested

Apply to Graduate Division at least two weeks before the beginning of the term applicant desires to enter

FEES AND FIRST YEAR AID

Tuition—\$79 per quarter for in state, \$207 for out of state Room—\$51 to \$59 per quarter Board—about \$260

A number of fellowships and assistantships are available with stipends varying from \$1,000 up In the event of demonstrated need, a student holding one of the above may make application for a supplementary grant in aid sufficient to cover all or a portion of his tuition costs, exclusive of student activity and medical fees The above appointments and fellowships may be held in addition to benefits under Public Laws 16, 346, and 550

Apply to the Graduate Division preferably between January 1 and April 1 However applications will be considered at other times when fellowships and assistantships are available

FIELDS OF STUDY FOR THE PH D

Chemical Engineering Fine particle technology, thermodynamics of solutions low temperature physics phase equilibria, diffusional operations mass and heat transfer Prerequisites un-

dergraduate courses required in the bachelor's program in chemical engineering, differential equations, upper quarter for doctorate, upper third for master's, except for special situations, good recommendations Faculty 6 full time, 1 part time 38 graduate students enrolled

Chemistry Analytical inorganic, organic, and physical Prerequisites differential and integral calculus, physical chemistry, plus undergraduate chemistry background from an accredited institution, upper quarter of class for doctorates, upper third for master's except for special situations, good recommendations Faculty 20 full time, 3 part time 31 graduate students enrolled

Civil Engineering Hydraulic, sanitary, soil mechanics and foundations, structural, transportation engineering photogrammetry Combined program with Chemical Engineering and Public Health Departments Prerequisites mathematics through differential equations, usual physical sciences and civil engineering undergraduate courses, plus life sciences for sanitary engineering, upper quarter of class for doctorate, upper third for master's, except for special situations, good recommendations Faculty 16 full time, 1 part time 28 graduate students enrolled

Electrical Engineering Power, communications, electro servo mechanisms Prerequisites electrical engineering undergraduate courses required in the bachelor's program, upper quarter of class for doctorate, upper third for master's, except for special situations, good recommendations Faculty 21 full time, 3 part time 48 graduate students enrolled

Mechanical Engineering Design—including strength design, mechanism synthesis, machine analysis, thermodynamics, heat transfer, fluid mechanics Prerequisites undergraduate courses required in bachelor's program in mechanical engineering, qualifying examinations in all or part of areas when candidate's background is questionable, upper quarter of class for doctorate, upper third for master's, except for special situations, good recommendations Faculty 14 full time, 4 part time 31 graduate students enrolled

Physics Microwave spectroscopy, solid state physics, nuclear energy levels and decay schemes, angular correlations of nuclear physics, and statistical mechanics Prerequisites the equivalent of a BS in physics, undergraduate deficiencies in specific areas may be made up during the first

year Upper quarter of class for doctorate, upper third for masters, except in special situations, good recommendations Graduate students are required to pass a set of preliminary examinations after about one year of graduate study Faculty 18 full time, 3 part time 20 graduate students enrolled

NOTES

A graduate seminar in teaching is offered each year

University of Georgia

ATHENS, GEORGIA

The Graduate School

The Ph D program was authorized at the University in 1936 and the first one awarded in 1941 The Ph D degree is designed to emphasize the pursuit of knowledge rather than mere training for a particular vocation Ed D degree is also offered.

Dormitory for male graduate students Marine biology research laboratory on Sapelo Island.

Men and women Summer courses 4 Ph D s awarded in 1956 7

Residence requirement for doctorate minimum of 3 years of study beyond the bachelor's degree, at least one year in residence at the University

ADMISSION REQUIREMENTS

Bachelor's degree with standing in the upper half of college class Students are generally not admitted to Ph.D. program until they earn an M.A. or M.S. For the M.A. or M.S. the candidate must have at least 90 quarter hours of work outside the field of the major in courses devoted to basic factual knowledge in the fields of fine arts English language and literature, foreign languages, mathematics, the natural and social sciences. Dean and department must approve application.

Languages required for admission to master's candidacy only by departments of the College of Arts and Sciences Reading knowledge of two

foreign languages and GRE (Aptitude and Area tests) required for admission to Ph.D. candidacy

Apply at least six weeks prior to time of initial registration to Office of the Dean of the Graduate School

FEES AND FIRST YEAR AID

Tuition—In state \$60 per quarter, out of state \$160

Graduate assistantships at \$1,500 available (competitively) to well qualified students, also Alumni Foundation Fellowships at \$1,600 per year to outstanding graduates Apply between January 1 and March 1 to Office of the Dean of the Graduate School

FIELDS OF STUDY FOR THE PH D

English American literature, 19th century English literature, 17th century and Milton, Shakespeare and Elizabethan literature, Chaucer and Middle English, Anglo Saxon period and linguistics Prerequisites undergraduate major in English, GRE Minors must be in fields supporting majors Faculty 28 full time, 3 part time 11 graduate students enrolled

History American history—with emphasis upon Georgia and the South, Latin America (Caribbean area), English and European Prerequisites undergraduate major in history, GRE General qualifying examination varies with individual candidate Faculty 8 full time, 1 part time 16 graduate students enrolled

Mathematics Algebra, topology, modern analysis Prerequisites undergraduate major in mathematics, GRE Faculty 9 full time 7 graduate students enrolled

Plant Sciences Plant taxonomy, plant physiology Combined faculty personnel in Departments of Botany, Agronomy, Forestry, Horticulture, and Plant Pathology are used Prerequisites undergraduate major in field selected for graduate study, GRE 16 graduate students enrolled

Psychology General theoretical, experimental, and physiological psychology Prerequisites undergraduate major in psychology, GRE Faculty 6 full time, 2 part time 8 graduate students enrolled

Zoology Parasitology, physiology, ecology Prerequisites undergraduate major in zoology, GRE Faculty 10 full time 15 graduate students enrolled.

Hartford Seminary Foundation

HARTFORD, CONNECTICUT

Hartford Seminary Foundation prepares college graduates for church centered vocations, and also directs research and advanced studies. It comprises three schools: Hartford Theological Seminary (1834), Hartford School of Religious Education (1885), the Kennedy School of Missions (1911), and an Institute of Church Social Service (1950).

The Foundation is controlled by a private corporation. Historically, there has been a strong Congregationalist tradition, however, there are no denominational requirements for trustees, students, or faculty.

Dormitories for men and women, some apartments available for married couples with children. Notable library collections of materials dealing with 18th-19th century New England theology, early English and American hymnology, Arabic printed books and manuscripts, and valuable Armenian, Turkish, Iranian, and other Far Eastern works.

4 Ph.D.s awarded in 1956-7

Residence requirements for doctorate: a minimum of two years of resident postgraduate study for the Ph.D., provided the postgraduate work totals four or more years. At least one year must be spent in full-time resident study in this Foundation.

Two types of Ph.D.s are awarded: 1. The usual Ph.D. in course; 2. The so-called Field Ph.D. This is granted to students of the Kennedy School of Missions who complete a year of residence work in Hartford and then go abroad to the mission field and carry on research, etc. for a term. These students return for a final year at the Kennedy School. In 1956, eighteen of the 28 Ph.D. students were seeking a Field Ph.D.

ADMISSION REQUIREMENTS

An A.B. or its equivalent, with high standards. If the proposed field of work lies within the curriculum of the Seminary, a B.D. with high standing from an accredited seminary.

A reading knowledge of not fewer than two languages in addition to English. Additional languages may be required in certain fields of study.

Apply before April 14 to Chairman, Council

for Advanced Studies, The Hartford Seminary Foundation

FEES AND FIRST YEAR AID

Tuition—\$250 per year or \$15 per credit hour. Room—\$150 per year. Board—\$350 per year, no meals on Sunday.

Approximately seven scholarships or fellowships, worth approximately \$1,000 each, are available each year.

Apply to Dean, Hartford Theological Seminary, prior to March 1.

FIELDS OF STUDY FOR THE PH.D.

Religion and Related Areas: Old Testament, New Testament, church history, philosophy of religion, theology, sociology, area studies in the Kennedy School of Missions, linguistics and anthropology in K.S.M., education and/or psychology in the School of Religious Education. Program is administered by the Council for Advanced Studies. Faculty: 25 full time, 10 part time. 28 graduate students enrolled.

Harvard University

CAMBRIDGE, MASSACHUSETTS

Graduate School of Arts and Sciences

Higher degrees in arts, sciences, and philosophy were first offered in 1872, although the Graduate School, as it was first known, was not founded until 1890. Since 1905 it has borne its present name and has been under the direction of the Faculty of Arts and Sciences with ordinary administration in the hands of an administrative board.

More than six million volumes are available in the main library. Four dormitories are reserved for graduate students.

Only men are admitted, but see also Radcliffe College. There are summer and evening courses, but these are not regular sessions, and there is no graduate credit given to participants in the evening sessions. 215 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: two years (four terms) of residence in the Graduate School of Arts and Sciences is required, but this

may be reduced (up to one year) if credit for graduate work done elsewhere is permitted

ADMISSION REQUIREMENTS

A previous record of marked distinction is called for. Evaluation is made on the basis of the applicant's general undergraduate record, letters from former teachers, and on work done in the subject he wishes to continue at the graduate level. The requirements for the bachelor's degree must be met before registration.

Language requirements depend upon departmental standards.

Social Relations Department requires MAT and portion of GRE. Psychology requires either MAT or Aptitude Test of GRE. Department of Music requires a test of its own devising.

Apply between February 1 and August 15 but preferably before February 1. Upon payment of the application fee of \$5, the Dean of the Graduate School of Arts and Sciences will supply the proper application form.

FEES AND FIRST YEAR AID

Tuition—\$800, plus \$36.50 fees for all students. Room—\$300-\$360 per year.

Approximately 300 scholarships are available, about 45 per cent of these given to first year men. Ordinary stipends go up to \$2,500. For first year men academic merit is the sole criteria.

Special fellowships include the Harvard Foundation Fellowships of at least \$2,200 (from 9 to 12 awards to entering students), the Gordoo McKay Prize Fellowships of \$2,200 in the Division of Engineering and Applied Physics.

Apply before February 1 to Graduate School of Arts and Sciences on the form supplied by the Graduate School.

FIELDS OF STUDY FOR THE PH.D.

(*Ad hoc* combinations of departmental offerings are possible after the first year.)

Anthropology Physical anthropology, ethnology and social anthropology (classified as a natural science), archaeology and ethnography. French or German examination must be passed by November 1 of the first term, the second language by November 1 of the second year. Recommended broad background in anthropology. 29 graduate students enrolled.

Architecture Landscape architecture, city and regional planning. Before preliminary examinations for the Ph.D. are given student must show

reading knowledge of French or German and an intermediate knowledge of the other. Statistics or another language may be substituted if the student's special field warrants it. Prerequisites: evidence of substantive work in the field in which the candidate wishes to take the Ph.D. Program administered by the faculties of Arts and Sciences and of Design.

Astronomy Astrophysics, galactic structure and the Milky Way, smaller bodies of the solar system. Prerequisites: two years of study beyond the elementary level in mathematics, physics, and astronomy, by the end of the second year of residence the candidate must be able to read two of the following: French, German, Russian (substitute possible). 14 graduate students enrolled.

Biochemistry This program is offered in close affiliation with the Departments of Chemistry and Biology but without the close ties to medicine or to agricultural science that are sometimes characteristic of biochemistry departments in other institutions. Prerequisites: basic undergraduate courses in chemistry, biology, physics, and mathematics, by middle of second year of residence a reading knowledge of scientific German and of either French or Russian is required. 8 graduate students enrolled.

Biology Botany, zoology, physiology. Prerequisites: one full course in general biology (zoology and botany), course in physics, course in chemistry, half course in botany beyond the elementary level, half course in zoology beyond elementary. Half course in physiology or biochemistry, three additional half courses in biology or related subjects, such as paleontology and historical geology, before taking Ph.D. qualifying examinations. Student must demonstrate a reading knowledge of two modern languages to include French or German. 57 graduate students enrolled.

Celtic Languages and Literatures Prerequisites: preliminary study of one Celtic language is ordinarily required, as well as knowledge of one or more of the following languages: French, German, Latin. For the degree, a thorough knowledge of two Celtic languages (normally Irish and Welsh) and a reading knowledge of three additional foreign languages is required.

Chemical Physics Study of chemical problems by methods and theories of modern physics, especially quantum mechanics. Prerequisites: a sufficient preparation in intermediate physical chem

istry, physics, and mathematics Same language requirement as that for chemistry In first year of residence there are qualifying examinations in physical and inorganic chemistry and in optics and electricity A committee from Chemistry and Physics Departments administers the program 10 graduate students enrolled

Chemistry Analytical, biological, organic, and physical chemistry Prerequisites at least one year each of inorganic, organic, physical, and analytical chemistry, one year of college physics and mathematics (calculus) Reading knowledge of German and of either French or Russian must be shown within three terms of initial registration Qualifying examinations during first year 98 graduate students enrolled

Classics Classical philology, archaeology, Biblical and Patristic Greek, medieval Greek and Latin Combined program with Philosophy Department Prerequisites 1 Classical philology competence in both Greek and Latin and command of elementary composition of both languages, before preliminary Ph D examinations, a reading knowledge of French and German, 2 Biblical and Patristic Greek good command of Greek and the equivalent of 2 years of college Latin, for degree, reading knowledge of French and German, 2 years of Hebrew and 1 year of Aramaic or 1 year of Syriac, 3 Classical Archaeology for degree, good knowledge of Greek and Latin and reading knowledge of French and German, 4 Medieval Greek A M in classical philology, reading knowledge of French and German, familiarity with modern Greek, 5 medieval Latin A M in classical philology, for degree, reading knowledge of French and German, 6 Classics and Philosophy A M in classical philology 27 graduate students enrolled

Comparative Literature Classical, medieval, Renaissance, modern By end of second year of residence student must demonstrate a reading knowledge of Greek, French and German, and one additional foreign language A secure control, in the original languages, of literatures to be studied in the Ph D program is required 23 graduate students enrolled

Economics Stress on theory, history, and statistics During studies student must demonstrate reading knowledge of economic texts in two languages, to include either French or German, or one language and mathematics Prerequisites normally, a distinguished undergraduate record

in economics Ph D in business economics also awarded in this field 98 graduate students enrolled

Education The program is designed to permit students who pursue a substantial program in the School of Education to follow, at the same time, studies in the related disciplines within The Graduate School of Arts and Sciences During studies a reading knowledge of two of the following is required French, German, Spanish, Russian, Chinese Recommended considerable breadth in philosophy and social science during the undergraduate program 6 graduate students enrolled

Engineering and Applied Physics Applied mathematics application of advanced mathematical methods to the solution of theoretical problems in physics and engineering, numerical analysis and large scale calculating machines, with program in data processing and control systems engineering, applied probability Applied physics electronics, electromagnetic phenomena, random processes communication engineering, acoustics, electrical engineering properties of matter (including physical metallurgy, solid state physics) Engineering civil engineering, including structures, hydraulics, sanitary engineering (including industrial hygiene), soil mechanics, mechanical engineering, nuclear engineering For the Ph D a reading knowledge of two approved modern foreign languages is required, preferably from the following French, German, Russian 186 graduate students enrolled

English English and American literature Before the fourth term of residence the student must demonstrate a reading knowledge of one ancient (Greek or Latin) and two modern (German, French or Italian) foreign languages 107 graduate students enrolled

Far Eastern Languages Chinese, Japanese, Mongolian languages, literatures, pre modern history Combined program with History Department For the Ph D program students must show a good reading knowledge of modern and ancient Chinese or Japanese and adequate knowledge of the other, also must have ability to use books in French and German Candidates are expected to demonstrate a special knowledge or aptitude in the field 6 graduate students enrolled

Fine Arts (History and Principles) Oriental, ancient, medieval, Renaissance, Baroque, mod-

ern art Reading knowledge of German and either French or Italian must be shown before the Ph.D. general examinations Recommended normally, creditable undergraduate record in art history, concentration in the subject desirable but not mandatory 26 graduate students enrolled

Geological Sciences Prerequisites Geology—four full undergraduate courses in geology and three in two or more related sciences geophysics—five undergraduate courses in mathematics and physics and two in geology In both—at least one full year of graduate work in geology and related sciences, and preferably the A.M. A reading knowledge of three of the following languages required for the Ph.D. if the student's native language is among them English German French, Russian For other students, a reading knowledge of two of the above languages If English is chosen, a written examination in English composition is required 48 graduate students enrolled

Germanic Languages and Literatures History of German literature and thought, history of German language and Germanic philology Prerequisites undergraduate work in German language and literature approximately equivalent to the requirement for an A.B. with honors in German at Harvard Before the preliminary Ph.D. examination a reading knowledge of Latin, French, and one Germanic language other than English and German is required 8 graduate students enrolled

History Ancient Europe medieval Europe modern Europe, the Americas the Near East, the Far East Prerequisites usually the major part of previous study will have been in history and social sciences but the Department sets no curriculum Before Ph.D. examinations a reading knowledge of two to four languages is required depending on specific area of study Written work must be submitted at the time of application for admission (course report, honors, or graduation study) 148 graduate students enrolled

History of American Civilization Social, political, economic, literary religious history, history of philosophy, science fine arts, education Prerequisites general knowledge of European history, American history, English or other European literature history of philosophy, before Ph.D. general examinations a reading knowledge of French and German (possibility of substitu-

tion for one of these) is required 23 graduate students enrolled

History and Philosophy of Religion Joint Program of Arts and Sciences and Divinity Faculties Philosophy of Religion—prerequisites knowledge of history of philosophy, ability to use Latin texts Religion other than Judaism or Christianity—prerequisites knowledge of languages necessary for study of religion chosen Old Testament and Intertestamental Judaism—prerequisites at least two years of Hebrew, before Ph.D. general examination two years of Greek, one of Aramaic, advanced Hebrew New Testament and Christian origins—prerequisites at least two years of Greek, before Ph.D. general examination, two years of Latin, one and one half years of Hebrew, one semester of Aramaic, Church History—prerequisites strength in college and graduate records in history, politics, sociology, literature, and language, proficiency in classical languages is essential Christian Theology—prerequisites basic knowledge of history of philosophy and of the history of Western religious thought, proficiency in Latin essential Religious Ethics—prerequisites advanced courses in social science and knowledge of history of Western philosophy Religion and Society—prerequisites background in theology such as is represented by the B.D. or S.T.B. degree, or considerable advance work in the social sciences and history Before Ph.D. general examination, ability to use French and German texts will be tested by examination Recommended broad preparation in philosophy (metaphysics theory of knowledge, ethics), languages, history and social sciences 34 graduate students enrolled

History of Science and Learning Prerequisites ordinarily a major in mathematics or a natural science and a minor in history, at a minimum, a thorough study of at least one natural science and some direct familiarity with historical studies, reading knowledge of French and German is required before the Ph.D. general examinations Elementary knowledge of Latin is desirable 8 graduate students enrolled

Linguistics Emphasis on a combination of linguistic fields, or emphasis on a geographical area Prerequisites previous work in some one linguistic field (either ancient or modern languages or a combination of both), for the Ph.D., a reading knowledge of French and German (and whatever other languages the student's pro-

gram requires) 9 graduate students enrolled

Mathematics Algebra, analysis, geometry, topology, mathematical physics Prerequisites an elementary knowledge of at least one modern foreign language, and by the end of the second year of residence a reading knowledge of German and French A previous concentration in mathematics or physics is desirable 61 graduate students enrolled

Medical Science Anatomy, bacteriology, biochemistry biophysics, pathology, pharmacology, physiology Prerequisites a thorough grounding in the biological and physical sciences, a reading knowledge (before preliminary Ph D examinations) of German and one of the following French Italian Japanese, Russian, Spanish Reading knowledge of two foreign languages is desirable An additional program in biochemistry administered by a Committee on Biochemistry 37 graduate students enrolled

Middle Eastern Studies Middle Eastern studies in anthropology, economics history, political science semitic languages and history For a Ph D the student must have an adequate command of one Middle Eastern language (Arabic, Hebrew, Persian, or Turkish) and a reading knowledge of one of the following French, German, Italian, Russian Recommended substantial work in the social sciences 7 graduate students enrolled

Music Theory and history of music Prerequisites interview, tests Students who hold a bachelor's degree and a master's in music, the latter conferred by some institution other than Harvard or Radcliffe, must take the following examinations in harmony and counterpoint, history and literature of music, translating French and German, and piano playing (including both the performance of prepared pieces and a sight reading test) Examinations may be taken *in absentia* For the degree, a reading knowledge of Italian is required 28 graduate students enrolled

Philosophy History of philosophy, logic, ethics, metaphysics Combined program leading to the Ph D in philosophy and Classics is offered A reading knowledge of two of the following French, German, Latin, Greek before the oral topical examination Recommended creditable undergraduate record in philosophy, but broad training in humanities and in special sciences is sufficient 49 graduate students enrolled

Physics Pure physics (properties of light

and other radiations, atomic and nuclear physics, electron physics, phenomena at extremely low temperatures) Prerequisites good preparation in intermediate physics and in mathematics, description of four most advanced courses in physics and mathematics, with names of textbooks used and subject matter covered By end of the fourth term of residence student must have reading knowledge of two languages from French, German, Russian Recommended GRE (two Aptitude Tests and Advanced Test in physics) 115 graduate students enrolled

Political Economy and Government Before Ph D general examination the student must have a reading knowledge of two foreign languages from an approved list (Substitution of either statistics or accounting for one language is possible) 2 graduate students enrolled

Political Science Combined program with Political Economy Before general Ph D examination—demonstration of a thorough reading knowledge of French or German and intermediate knowledge of the other (substitution of statistics or another language is permitted), specimen of written work (thesis, essay, term paper, review) 47 graduate students enrolled

Psychology Sensation and perception, learning, motivation, physiological psychology, psychoacoustics, experimental analysis of behavior history of psychology By end of second year of residence student must have reading knowledge of two foreign languages from French, German, Russian, or unusual competence in one of these GRE (Aptitude sections) or MAT required Recommended undergraduate major in psychology desirable, but broad training in biology, mathematics, physics, philosophy, or social science is preferred to overconcentration in psychology 17 graduate students enrolled

Romance Languages and Literatures Linguistics and literatures of French Italian, Spanish, Portuguese, Rumanian, Old Provençal, Vulgar Latin Prerequisites undergraduate concentration in at least one Romance language and literature, study of a second Romance language and literature However, a reading knowledge of French, Italian, Spanish, Latin, and German is required before the Ph D general examinations 22 graduate students enrolled

Sanskrit and Indian Studies Prerequisites work in some area of Indian studies, either history or literature, elementary knowledge of San-

skrit For the degree, student must have reading knowledge of French and German Indian students must have reading knowledge of Sanskrit 5 graduate students enrolled

Semitic Language and History Combined program with Middle Eastern Studies and Semitic Knowledge of Hebrew and Arabic required Before degree, in addition to good knowledge of two Semitic languages, reading knowledge of German and one other modern language (Greek or Latin or both required for certain fields of study) 3 graduate students enrolled

Slavic Languages and Literatures Linguistics, literature, and folklore of the Slavic peoples Courses offered in Old Church Slavonic, Russian, Ukrainian, Polish, Czech, Serbo Croatian, Bulgarian Prerequisites adequate knowledge of one Slavic language, for degree reading knowledge of one other Slavic language (two for the linguistics program), French and German Test in one Slavic language is given at the beginning of term (oral and written)

Social Relations Social anthropology (as a social science), sociology social psychology, clinical psychology Prerequisites sociology and social anthropology background in scientific study of human social behavior social psychology one full college course in biology one half course in physiological psychology, clinical psychology biology or physiological psychology, child or genetic psychology abnormal psychology By the third term student must have reading knowledge of one of the following French, German, Russian 90 graduate students enrolled

NOTES

About one quarter of the Harvard graduate students instruct, under the close guidance of the senior staff, Harvard College undergraduate students in classroom and in laboratory sections

University of Hawaii

HONOLULU, HAWAII

Graduate School

Established as the Graduate Division of the University in 1910 Ph D first offered in 1931 Hawaii's geographical position and economy, dependent upon tropical agriculture, have served as

stimuli for the offering of the Ph D in the fields basic to tropical agriculture and marine zoology

University is supplemented by staffs and facilities of cooperating research institutions such as those run by trade associations Hawaii Marine Laboratory US Fish and Wildlife Service Laboratory on campus 2 Ph D's awarded in 1956-7

Minimum of three semesters in residence required for doctorate

ADMISSION REQUIREMENTS

Certified baccalaureate degree required Admission as candidate for Ph D requires proof of adequate preparation, as determined by departmental committee, and proved ability to do superior work

Facility in English a prerequisite GRE recommended

Apply at any time to Dean of the Graduate School

FEES AND FIRST YEAR AID

Tuition—\$95 plus laboratory fees Room—\$40 and up per semester for men, \$90 and up for women

Half time teaching assistantships available Application blanks should be obtained from the Dean of Faculties and returned before March 15

FIELDS OF STUDY FOR THE PH D

Botany Prerequisites cryptograms, physiology taxonomy, anatomy or morphology, general bacteriology, general chemistry Faculty 6 full time, 3 part time 3 graduate students enrolled

Chemistry Inorganic analytical, organic, biological, or physical chemistry Prerequisites general, organic, and physical chemistry, qualitative analysis Faculty 9 full time, 8 part time 9 graduate students enrolled

Entomology Prerequisites general zoology, general entomology, economic entomology, general physiology, insect morphology, systematic entomology, two years of chemistry, one year of physics, algebra, botany, and genetics Faculty 5 full time, 7 part time 2 graduate students enrolled

Genetics Prerequisites introductory genetics, general botany, general chemistry, entomology, college algebra, general zoology, a year of course work (30 semester hours) at the graduate level

in a university with a strong department of genetics Recommended analytical geometry Faculty 5 full time, 6 part time 2 graduate students enrolled

Soils Tropical soil genesis and classification soil management, weathering of soils fundamental physical and chemical properties of soils Prerequisites 18 semester hours in soil science bacteriology, analytical and physical chemistry, geography, mineralogy, physics, plant physiology, 30 semester hours of graduate course work in a university with a strong department of soil science

Zoology Marine aspects Prerequisites comparative anatomy of vertebrates, vertebrate embryology general physiology two years of chemistry, one year of physics algebra, and botany Faculty 8 full time, 6 part time 9 graduate students enrolled

NOTES

A University wide seminar (separate meeting for graduate students) is held on methods of increasing effectiveness in college teaching Voluntary attendance and non credit

Hebrew Union College- Jewish Institute of Religion

CINCINNATI, OHIO

Graduate Department

Established 1875 Essentially a seminary for the training of rabbis Five year program leading to ordination Awards the Doctor of Philosophy degree in Hebrew and cognate studies, also the Doctor of Hebrew Letters degree The entire work for the D.H.L. degree may be done in non residence Candidates for the Ph.D. degree normally spend three years in residence at the Cincinnati School, which is housed in five buildings upon its own 18 acre tract

Men Private control 2 Ph.D.'s awarded in 1956 7

Residence requirements for doctorate at least two years for a total of 90 graduate credits Alumni of the College Institute may receive for courses taken prior to graduation up to a total of 32 credits towards the 90 credits required.

ADMISSION REQUIREMENTS

General. For Ph.D. degree bachelor's degree and demonstration of ability to do graduate work in the field of Hebrew and cognate studies

Language. One foreign language other than Hebrew At the discretion of the professor in the major subject, additional modern and/or ancient language can be required.

Apply between September 1 and March 1 to Chairman, Committee on Graduate Study

FEES AND FIRST YEAR AID

Tuition—\$375 annually

Resident Interfaith Fellowships \$2,750 for married students, \$2,150 for single students in Graduate Department

Apply to Chairman, Committee on Graduate Study between September and March 1

FIELDS OF STUDY FOR THE PH.D.

Bible Faculty 3 full time, 2 part time 12 graduate students enrolled

Hebrew Faculty 3 full time, 4 part time 5 graduate students enrolled.

Semitic Languages Faculty 2 full time 5 graduate students enrolled

NOTES

Major fields of study Bible, rabbinics, Semitic languages Hebrew literature, Jewish history, Jewish education, Jewish religious thought

Hebrew Union College Jewish Institute of Religion, 40 West 68th Street, New York 23, New York, offers Doctor of Hebrew Letters degree

University of Houston

HOUSTON, TEXAS

Graduate Division

The first doctorate was awarded in 1947 (in education), the first Ph.D. in 1953

The University provides dormitory facilities for both men and women A special facility is the University's computer

Summer and evening courses available Men and women

Residence requirement for doctorate at least one year of full time continuous residence

ADMISSION REQUIREMENTS

Master's degree, or the equivalent, with a minimum GPA of 3.3 (B+) on all prior graduate work.

Two modern languages

Passing scores on preliminary examinations are required

Complete applications must be filed at least one month prior to registration

FEES AND FIRST YEAR AID

Tuition—\$50 per course Room—approximately \$120 per semester

Assistantships in teaching and research are available Apply to the Department of Psychology at least one month prior to registration

FIELDS OF STUDY FOR THE PH.D.

Psychology Business and industrial, clinical and educational psychology, and counseling Prerequisites classification by the Department as a doctoral precandidate a 3.3 (B+) GPA on master's level work, tests as prescribed by the committee

NOTES

Supervised teaching during late candidacy and a course in educational psychology are offered

Illinois Institute of Technology

CHICAGO 16 ILLINOIS

The Graduate School

The Institute was established in 1940 by consolidation of the Armour Institute of Technology (chartered 1892) and the Lewis Institute (founded 1896) First Ph.D. was awarded in 1939 by the Graduate School, which had been formed three years before. In 1949 the Institute of Design founded in 1937 was consolidated with the Institute

Campus is being constructed in its urban location in the functional design prepared by the Director of its Architecture Department, Ludwig Mies van der Rohe

Special features include an A.C. network calculator, an instrumentation laboratory, including a double beam infrared spectrometer, a Beckman

spectrophotometer, an X-ray diffraction unit, several polarographs, a spectrograph, a densitometer, a 1.75 MEV electrostatic generator for acceleration of hydrogen and helium ions, a laboratory of molecular spectroscopy, an electron microscope with diffraction attachment, a Varian electromagnet Affiliate Armour Research Foundation has a 50 KW nuclear reactor and an IBM 650 digital computer

Men and women. Private control Summer and evening courses 19 Ph.D.s awarded in 1956-7

Residence requirement for doctorate a minimum of one year of residence The doctorate is awarded solely on the student's level of attainment not on the number of years spent in study

Letters of recommendation from former graduate school faculty members are required of transfer students

ADMISSION REQUIREMENTS

Admission to the school does not guarantee subsequent admission to candidacy Applicants with less than a B average in undergraduate work are ordinarily not accepted for candidacy for the Ph.D.

No languages required for admission to school but French and German are required for admission to candidacy

Letters of recommendation will be requested, also a statement from the applicant describing any special training or professional experience

Apply to Office of Admission before April 1 to receive priority for September admission Provisional admission possible for late applicants

FEES AND FIRST YEAR AID

Tuition—\$375 per semester Room and board approx \$375 per semester Dormitory facilities available for single students, apartments for married students

FIELDS OF STUDY FOR THE PH.D.

Architecture Prerequisite undergraduate degree in architecture Faculty 8 full time 24 graduate students enrolled, 2 part time.

Biology Bacteriology biochemistry, zoology Prerequisites preparation must include the following courses or equivalents—botany or zoology physiology quantitative analysis, two semesters of organic chemistry, college physics, and mathematics through integral calculus Stu

dent without any of these must remove deficiencies before admission to the candidacy Faculty 4 full time, 1 part time 10 full time graduate students enrolled, 33 part time

Business and Economics Prerequisites 30 semester hours of basic business and economics subjects Faculty 7 full time 3 full time graduate students enrolled, 36 part time

Chemical Engineering Prerequisite bachelor's degree in this field Students who have degrees in chemistry or other fields of engineering or science and who have not studied unit operations of chemical engineering, may have to take some additional courses without graduate credit Faculty 5 full time, 1 part time 15 full time graduate students enrolled, 52 part time

Chemistry Prerequisites bachelor's degree in this field, with a minimum of one year of undergraduate training (including laboratory) in general, analytical, organic, and physical chemistry In addition, one year of physics mathematics through calculus and English composition, approximately 15 semester hours or their equivalent in humanities, working knowledge of at least one foreign language, preferably German Provisional status for students also possible Faculty 15 full time 33 full time graduate students enrolled, 57 part time

City Planning Prerequisites bachelor's degree in architecture landscape architecture, civil engineering, or social science Faculty 5 full time

Civil Engineering Prerequisites bachelor's degree from ECPD accredited institution Provisional admission possible for students in other fields of engineering Faculty 7 full time, 1 part time 5 full time graduate students enrolled, 42 part time

Electrical Engineering Prerequisites bachelor's degree in electrical engineering from ECPD accredited institution Outstanding students from related fields may be admitted as special students for later transfer to regular status after removing undergraduate deficiencies Faculty 7 full time 27 full time graduate students enrolled, 110 part time

Gas Technology Prerequisites undergraduate program in gas technology, or, subject to removal of undergraduate deficiencies related to the specialization in gas technology, an accredited bachelor's degree in a related field such as chemical or mechanical engineering Faculty 5 full

time 1 full time graduate student enrolled

Industrial Engineering Prerequisites mathematics through differential equations, statistics, basic science and the fundamentals of engineering Deficiencies in undergraduate industrial engineering courses may be removed in graduate school Program emphasizes the quantitative and engineering aspects of industrial management Faculty 4 full time 3 full time graduate students enrolled, 37 part time

Mathematics Prerequisites 20 semester hours in mathematics beyond integral calculus, or provisional admission until deficiencies are removed Faculty 11 full time, 10 full time graduate students enrolled, 30 part time

Mechanical Engineering Prerequisites normally a bachelor's degree in this field from ECPD accredited institution However, a candidate with exceptional proficiency in mathematics, mechanics, and physics, with a bachelor's degree in another field, may sometimes be provisionally admitted Deficiencies in specialized mechanical engineering courses will not be treated as a major obstacle to graduate study, each candidate's admission will be considered individually Faculty 7 full time, 1 part time 28 full time graduate students enrolled, 97 part time

Mechanics Theoretical mechanics mechanics of solids mechanics of fluids, experimental stress analysis Prerequisites adequate preparation in mathematics engineering, or physics or any combination of these Faculty 5 full time 4 full time graduate students enrolled 20 part time

Metallurgical Engineering Prerequisites admission is initially based on an undergraduate degree in this or related field, but is subject to a qualifying examination to be taken within the first year of graduate study Faculty 4 full time 3 full time graduate students enrolled, 22 part time

Physics Molecular structure, nuclear physics, solid state physics and physical electronics Prerequisites a bachelor's degree in physics, with 15 semester hours of physics beyond general physics This should include intermediate mechanics and mechanics and magnetism Holders of bachelor's degrees in related fields, such as mathematics and chemistry, may be admitted provisionally subject to the removal of undergraduate deficiencies Faculty 5 full time 15 full time graduate students enrolled, 48 part time

Psychology Industrial, physiological experi

mental, clinical psychology Prerequisites bachelor's degree, an undergraduate program which included a minor in psychology Students whose undergraduate programs did not include certain basic courses in psychology may occasionally be provisionally admitted, but deficiencies must be made up before admission to candidacy Faculty 5 full time, 12 full time graduate students enrolled, 26 part time

NOTES

Graduate students are urged to get some experience as teaching assistants

University of Illinois

URBANA, ILLINOIS

Graduate College

The Graduate School was established in 1908, although advanced degrees were awarded earlier Graduate work is offered in 63 departments or divisions

Doctorates in the medical sciences and in pharmaceutical chemistry are offered at the University's Chicago Professional Colleges

A digital computer laboratory, electron microscope laboratory, ultracentrifuge laboratory, physical environment unit, radiocarbon laboratory, betatron, and a cyclotron

Men and women Summer courses 251 Ph.D.s awarded in 1956-7

Residence requirement for doctorate two of the three years required for the doctorate must be spent in residence

ADMISSION REQUIREMENTS

A scholastic average of at least 3.5 (A being 3) computed on the basis of the last 60 hours of work completed, plus the approval of the major department, which may require a higher average than the general requirement.

Language requirements vary, depending upon the major field.

Apply at least six weeks prior to date instruction begins to the Office of Admissions, 100 Administration Building.

FEES AND FIRST-YEAR AID

Tuition—\$200 per academic year for in state, \$350 for out of state Room—\$25 \$50 per month Board—\$15 \$18 per week

Fellowships carrying stipends of \$1,200, plus exemption from tuition and incidental fees for the period of the appointment and for the Summer session immediately following, part time teaching and research assistantships at a salary of \$1,800 (half time), plus fee exemptions, scholarships providing usual fee exemption only

Apply between September 1 and February 15 to Graduate College, 109 Administration East, or major department

FIELDS OF STUDY FOR THE PH.D.

(Reading knowledge of German and French is required of all candidates)

Accountancy General accounting theory, governmental accounting, administrative accounting, income tax development Prerequisites 20 hours of undergraduate work in accountancy, at least one course each in principles of economics and finance Faculty 16 full time 55 graduate students enrolled

Aeronautical Engineering Aerodynamics, structure, propulsion Prerequisites BS in aeronautics preferred, BS, with major in mathematics or physics—deficiencies in aeronautical engineering to be determined Faculty 6 full time 17 graduate students enrolled

Agricultural Economics Farm management, land economics, marketing prices and statistical analysis, rural sociology Prerequisites at least 12 hours of undergraduate economics and agricultural economics, 8 hours of accountancy, business law, history, management, marketing, political science, or sociology Faculty 18 full time 47 graduate students enrolled

Agronomy Crops and soils Prerequisites 20 hours of agronomy and related subjects, or broad and thorough background in science Faculty 30 full time 60 graduate students enrolled

Animal Science and Animal Nutrition Animal genetics physiology, animal nutrition, live stock or poultry production, meats Prerequisites 20 hours in general field of animal science or nutrition, including genetics, organic chemistry, principles of feeding livestock, production, and management, introductory courses in physiology, zoology, and mathematics are considered highly

desirable Faculty 15 full time 52 graduate students enrolled

Bacteriology Viruses, metabolism, microbial enzymes, microbial biochemistry and physiology, genetics, and food bacteriology Prerequisites 15 hours of physical and biological sciences general bacteriology, chemistry through quantitative analysis, and organic chemistry Faculty 7 full time 35 graduate students enrolled

Biophysics Photobiology, electrophysiology, radio biology, and bioacoustics, applications of general biophysics to cellular physiology, microbiology, molecular biology, and muscular contraction Prerequisites one year each of college biology and physics, five hours of quantitative analysis, five hours of organic chemistry, six hours of calculus Faculty interdepartmental 5 graduate students enrolled

Botany Morphology, genetics, virology, ecology, mycology, taxonomy, physiology Prerequisites 20 hours in botany and related subjects Faculty 14 full time 21 graduate students enrolled

Business All students take broad program in management, marketing economic theory, and two related fields Prerequisites major in commerce or business or equivalent program Faculty interdepartmental 12 graduate students enrolled

Ceramic Engineering Materials porcelain enamels, glass structural clay products refractories Prerequisites 25 semester hours of courses in general analytical physical, and organic chemistry, calculus, one year of college physics, 18 hours in ceramics, or the equivalent Faculty 5 full time 13 graduate students enrolled

Chemistry and Chemical Engineering Analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, physical chemistry, chemical engineering Prerequisites 25 semester hours in chemistry, one year each of physics, French, and German, mathematics through differential and integral calculus Faculty 44 full time 279 graduate students enrolled

Civil Engineering Transportation, municipal engineering hydraulic engineering, structural engineering, soil mechanics and foundations Prerequisites BS in engineering with a major in the field of specialization Faculty 31 full time 145 graduate students enrolled

Classics Classic philology, Greek, and Latin Prerequisites for Greek—at least three years of

college Greek and two years of Latin, for Latin—at least two years of preparatory Latin and three years of college Latin Recommended history and philosophy Faculty 4 full time 5 graduate students enrolled

Dairy Science Dairy bacteriology, biochemistry, cattle feeding and nutrition cattle breeding and genetics, physiology of lactation and reproduction Prerequisites general training in biological sciences, including chemistry and mathematics Faculty 12 full time 24 graduate students enrolled

Economics Economic theory, public finance and taxation, monetary theory, international economics labor economics, corporation finance, transportation, industrial organization Prerequisites 27 hours in the social sciences, including 15 hours in economics, work in economics must include course in principles and one in statistics Faculty 38 full time 59 graduate students enrolled

Education Administration and supervision, agricultural education home economics education industrial education, curriculum, education of exceptional children, educational psychology, elementary school teaching, guidance and counseling history and philosophy of education, research methods, secondary school teaching, school psychology Faculty 73 full time 437 graduate students enrolled

Electrical Engineering Electronics, illumination, and power Prerequisites bachelor's degree in electrical engineering with major in area of specialization Faculty 40 full time 154 graduate students enrolled

English English and American literature and philology Prerequisites 14 hours of undergraduate work in English or American literature, four semesters of college work in Latin, Greek, French, or German Faculty 28 full time 117 graduate students enrolled

Entomology General entomology, insect biochemistry, economic entomology, toxicology of insecticides insect physiology Prerequisites 2 years of undergraduate work in biology, including zoology and at least 6 hours in entomology Faculty 8 full time 27 graduate students enrolled

Food Technology and Dairy Technology Food chemistry, food engineering food microbiology, food processing dairy technology Prerequisites adequate training in chemistry, bacteriology, chemical engineering, horticulture, or

other recognized fields of biological, physical, agricultural or engineering science Faculty 12 full time 34 graduate students enrolled

French Literature and philology Prerequisites 4 years of college French, advanced courses in literature, basic knowledge of Latin and reading competence in German Faculty 10 full time 19 graduate students enrolled

Geography Regional, political historical, educational, and economic geography, climatology cartography, land utilization, and conservation of resources Prerequisites 18 hours of work in geography and good background in physical and biological sciences Faculty 9 full time 26 graduate students enrolled

Geology Economic, glacial, and ground water geology, clay mineralogy, geomorphology, mineralogy, petrography, paleontology, stratigraphy, and sedimentation Prerequisites undergraduate major in geology, including field training, and courses in chemistry, mathematics, and physics Faculty 13 full time 70 graduate students enrolled

German Philology, linguistics, and literature Prerequisites 4 years of German, general knowledge of German letters and civilization Faculty 7 full time 13 graduate students enrolled

History Ancient, medieval, modern European, English, Latin, American Prerequisites 2 years of college work in history, including European and American history linguistic preparation, especially in French and German Latin essential for medieval history Faculty 19 full time 68 graduate students enrolled

Horticulture Floriculture, plant breeding pomology vegetable crops Prerequisites 20 hours of undergraduate work in horticulture and allied subjects Faculty 11 full time 18 graduate students enrolled

Library Science Readers and technical services Prerequisites 18 semester hours of library science, or completion of a preparatory sequence of four courses offered each semester and summer session Faculty 14 full time 93 graduate students enrolled

Mass Communications Individual and social processes of communications Prerequisites undergraduate preparation in social sciences, including psychology, sociology, political science, economics, and statistics Faculty interdepartmental 14 graduate students enrolled

Mathematics Algebra, analysis, applied math

ematics, geometry, topology, and statistics Prerequisites 20 hours of undergraduate work in mathematics starting with calculus Faculty 46 full time 109 graduate students enrolled

Mechanical Engineering Thermodynamics, combustion, gas dynamics, machinery dynamics, nuclear power engineering, production engineering Prerequisites BS in mechanical engineering or equivalent Faculty 16 full time 60 graduate students enrolled

Mining and Metallurgical Engineering Petroleum engineering, mineral dressing, mining engineering, physical metallurgy, process metallurgy Prerequisites BS in mining engineering or the equivalent, or BS in metallurgy, physics, or chemistry Faculty 16 full time 34 graduate students enrolled

Music Music education, applied music, composition theory, and musicology Prerequisites bachelor's degree in the area of specialization, qualifying examination in performance, composition theory, or musicology, whichever is pertinent Faculty 57 full time 72 graduate students enrolled

Philosophy History of philosophy, theory of knowledge, and theory of value Prerequisites at least one course in logic and ethics, a general course in the history of philosophy Faculty 11 full time 21 graduate students enrolled

Physical Education Teacher education, administration scientific analysis of physical education activities recreation, and health education Prerequisites 30 hours in field of specialization or related courses, 16 hours in education statistics or measurement, also, in physical education—18 hours in science, in recreation—15 hours in social sciences, including psychology, and 8 in the natural sciences, in health education—24 hours in science Faculty 16 full time 53 graduate students enrolled

Physics Nuclear physics nuclear magnetic resonance cosmic ray physics physics of solids Prerequisites 20 hours in physics beyond general physics course, including work in theoretical mechanics and in electricity and magnetism Faculty 64 full time 153 graduate students enrolled

Physiology Mammalian, comparative, cellular, and human physiology, endocrinology, human anatomy, bioclimatology, radiobiology Prerequisites adequate background in chemistry, physics, biological sciences, and mathematics

Faculty 9 full time 40 graduate students enrolled

Plant Pathology Diseases of field crops, forest and shade trees, fruit crops, vegetable and canning crops, plant virology, nematology fungi, antibiotics, physiology of fungi, biochemistry of plant diseases Prerequisites chemistry through organic, adequate background in botany, bacteriology, and entomology Faculty 11 full time 18 graduate students enrolled

Political Science American government and politics, comparative government and politics, international law and relations, public administration, political theory and jurisprudence Prerequisites minimum of 20 hours of undergraduate work in political science, economics, sociology, and history, including at least 12 hours in political science Faculty 15 full time 35 graduate students enrolled

Psychology General experimental, social, clinical, industrial, and school psychology, personality, psychometrics, counseling, human engineering Prerequisites minimum of 15 semester hours in psychology, laboratory course in experimental psychology and in another laboratory science, statistics Faculty 27 full time 79 graduate students enrolled

Sociology General sociology, sociological theory, criminology and penology, public opinion, collective behavior Prerequisites 9 hours in sociology, 15 in anthropology, economics, history, mathematics philosophy, political science and psychology Recommended a course in sociological research methods Faculty 22 full time 29 graduate students enrolled

Spanish Italian, and Portuguese Linguistics and literature Prerequisites undergraduate major in the language, basic knowledge of Latin Faculty 11 full time 22 graduate students enrolled

Speech Rhetoric and public address, the theatre, speech science speech and hearing disorders Prerequisites well rounded undergraduate background, with at least 15 hours in speech Faculty 23 full time 54 graduate students enrolled

Theoretical and Applied Mechanics Manufacturing dynamics, elasticity, plasticity, buckling, energy methods, fluid mechanics, and engineering materials Prerequisites BS in engineering, physics, mathematics, or the equivalent.

Faculty 15 full time 31 graduate students enrolled

Veterinary Sciences Anatomy, microbiology, parasitology, pathology, physiology, pharmacology Prerequisites 5 hours of physics or mathematics, 14 hours of chemistry, 15 hours of biological science Faculty 9 full time 16 graduate students enrolled

Zoology Ecology, taxonomy, vertebrate anatomy, invertebrate zoology, experimental zoology Prerequisites at least 2 years of undergraduate work in zoology Recommended at least one summer at a marine biological station, familiarity with Latin and Greek Faculty 15 full time 49 graduate students enrolled

Indiana University

BLOOMINGTON, INDIANA

The Graduate School

Established in 1904, the Graduate School is under the control of its faculty and is administered by a Dean with the assistance of an elected Graduate School Council of nine Graduate degrees have been conferred since 1881 Students in education and music may become Ph.D. candidates by enrolling in the Graduate School, the only subdivision offering the M.A. and Ph.D.

Allied divisions offering the doctorate include the School of Education (Ed.D.), School of Business (D.B.A.), School of Music (D.Mus. Ed.), School of Health, Physical Education and Recreation (D.Health & Safety, D.Phys. Ed., D.Recreation)

The Graduate Residence Center provides room and board for about 1,000 single persons, housing units for more than 1,000 families are also available (occupied chiefly by graduate students)

Library collections on Lincoln, Defoe, Wordsworth, Conrad, English history (1688 to 1731), American folklore, Indiana history, the War of 1812, the American Revolution, Lafayette, Josiah K. Lilly collection of rare books and manuscripts Biological station, geologic field station in Montana, observatory, extensive wild life preserves, human relations area files, cyclotron, cosmic ray laboratory, achronic and anachronic laboratories,

audio-visual center, graduate institute for mathematics and mechanics, East European Institute
Affiliation with Argonne National Laboratory

Summer courses offered 79 Ph.D.s awarded in 1956-7

Residence requirement for doctorate six semesters of residence, of which at least two consecutive semesters must be spent at Indiana University

ADMISSION REQUIREMENTS

Baccalaureate degree required. Decision on admission is based on the quality and quantity of preparation, promise as a scholar, and personal qualifications. Applicant's credentials are sent to departments for evaluation and recommendation, admission is granted by the Dean.

French and German, or other languages with consent of the Dean, there can be no substitution of other subjects for languages

Qualifying examinations are required for admission to candidacy, during the candidacy a thesis and final oral examination are required

Apply to the Dean at least one month before matriculation.

FEES AND FIRST YEAR AID

Tuition—in state \$7 per credit hour, out of state \$15.25. Room and board in Graduate Residence Center, \$670 to \$715 for 2 semesters of 18 weeks, trailers rentable at \$45 per month, including utilities, apartments at \$48.50 to \$93.50

Financial assistance includes 35 university fellowships at \$1,200 to \$1,600, 10 to 12 Edward Fellowships at stipends up to \$1,600, other endowed fellowships in various departments, 40 fee remission scholarships, over 400 graduate assistantships mostly in the \$1,200-\$1,800 range, on 10 months basis for one-third time, 75 dormitory counselorships and loan funds. All university fellowships carry a waiver of out of state fees

Apply before February 15 to Dean of Graduate School for fellowships and scholarships, to appropriate departments for assistantships, to Director of Counseling and Activities for counselorships

FIELDS OF STUDY FOR THE PH.D.

Anatomy Human anatomy, histology. Prerequisites: physics, chemistry, 25 hours in biological

sciences. Faculty 6 full time. 6 graduate students enrolled.

Anthropology Cultural anthropology, linguistics (especially American Indian tongues), physical anthropology. American Indian archaeology. Prerequisite courses depend upon the specialty at the graduate level. Faculty 4 full time, 2 part time. 18 graduate students enrolled.

Astronomy Stellar motions, spectroscopy, radio-astronomy, celestial mechanics, astrophysics. Combined program with Physics Department leads to Ph.D. in astrophysics. Prerequisites: physics, mathematics or astronomy major in undergraduate work. Faculty 5 full time. 14 graduate students enrolled.

Bacteriology Taxonomy, viruses, physiology, anaerobic bacteria. Prerequisites: an undergraduate major in bacteriology and biology, chemistry. Faculty 5 full time. 18 graduate students enrolled.

Botany Anatomy and morphology, physiology, systematics, mycology, cytology and cytogenetics. Physiology. Prerequisites: undergraduate major in botany or biology. Recommended: chemistry, physics, and mathematics. Faculty 7 full time. 32 graduate students enrolled.

Chemistry Analytical, biological, inorganic, organic, physical. Prerequisites: undergraduate major in chemistry as approved by the American Chemical Society, placement tests on entrance. Recommended: a core of basic graduate courses in the various areas. Faculty 20 full time. 97 graduate students enrolled.

Classics Latin, Greek literature, classical civilization. Prerequisite: an undergraduate major in classics. Faculty 5 full time. 5 graduate students enrolled.

Comparative Literature Classical, medieval, modern, folklore, criticism. Interdepartmental cooperation in the program. Prerequisites: fluent knowledge of one foreign language, reading knowledge of a second. Faculty 16 part time. 25 graduate students enrolled.

East European Studies Language, literature and area studies relating to Finland, the East Baltic, Poland, Czechoslovakia, Hungary, Romania, Yugoslavia, Bulgaria, Albania, Greece, and Turkey. Cooperating departments in this interdepartmental program award the Ph.D. A master's program is administered by the Institute of East European Studies. Prerequisites: undergraduate major in East European language or lit

erature or in some social science area or history, French or Russian, other subjects depending on field of concentration Faculty 8 part time 2 graduate students enrolled

Economics Economic history, comparative economic systems, international economics labor economics, money and banking, public finance, statistics, social control and economics of industry, consumer economics A combined program is offered with the School of Business leading to the Ph D in economics and business This latter program includes a selection of studies from the following areas business finance, public utilities and transportation, real estate management, insurance, business government relationships Pre requisites an undergraduate major in social science and business courses Faculty 16 full time 49 graduate students enrolled.

Education Adult, audio visual, business, college and university, elementary, nursing secondary, and vocational education, guidance, history and theory of education, educational psychology, library science, school administration This is a combined program with work done in the School of Education (except for one outside minor), but the degree requirements are set and the degree conferred by the Graduate School Pre requisites a minimum of ten hours of education Ed D is also awarded in this field of study by the School of Education Faculty 37 full time 42 graduate students in Education enrolled in the Graduate School

English All fields of English and American literature, creative writing criticism, linguistics Pre requisites an undergraduate major in English, preliminary examinations, Qualifying examination required for candidacy Faculty 26 full time 143 graduate students enrolled

Folklore Primitive religion, arts and industries, music and poetry, American Indian, American folklore, literary origins, Russian, Scandinavian, Baltic, Western and Southern Slavic, Finnish, etc Pre requisites a major in literature, anthropology, or other humanity or social science (especially history, philosophy, sociology, or psychology), or combination thereof Five departments cooperate in this interdepartmental program Faculty 2 full time, 7 part time 12 graduate students enrolled

French and Italian Various periods in French and Italian literature Pre requisites German and at least one Romance language in addition to

French Faculty 9 full time. 21 graduate students enrolled

Geography Historical, economic, political, physical Faculty 6 full time 12 graduate students enrolled

Geology All branches, including geochemistry, geophysics, glacial geology paleontology, petroleum geology, etc Pre requisites undergraduate major in geology, plus chemistry, physics, and analytical geometry Faculty 10 full time. 58 graduate students enrolled

German Language, literature, linguistics Pre requisites undergraduate major in German, French Faculty 7 full time 13 graduate students enrolled

Government Public law, politics, international law and relations, public administration political theory, state and local government, comparative government Pre requisites undergraduate major in government Faculty 15 full time. 84 graduate students enrolled

History Ancient, medieval, Renaissance, Reformation, modern European, Russian, English, Far Eastern, Latin American United States Pre requisites an undergraduate major in history Faculty 12 full time 94 graduate students enrolled

Latin American Studies Language, literature, history An interdepartmental program administered by the Latin American Studies Committee 8 part time faculty members 2 graduate students enrolled

Linguistics American Indian, East European (Slovak, Uralic), Turkic Also African, classical English, Germanic, Romance This is an interdepartmental program administered by the Linguistics Committee Faculty 11 part time. 24 graduate students enrolled

Mathematics Analysis, geometry topology, statistics, and applied mathematics Pre requisite undergraduate major in mathematics Department of Mathematics and the Graduate Institute for Mathematics and Mechanics together administer the program. Faculty 13 full time 50 graduate students enrolled.

Medical Microbiology Parasitology immunology, chemistry, viruses and Rickettsias, medical entomology Program is given by the Department of Microbiology of the Medical School Faculty 7 full time 2 graduate students enrolled

Music Musicology, music theory, music education Pre requisites 30 hours of liberal arts or

median scores in 3 out of 5 GRE achievement tests, major in music. Other doctorates awarded in this field by the Music School, which administers the program, are Doctor of Music, Doctor of Music Education. Faculty 21 full time. 62 graduate students enrolled in the Graduate School.

Philosophy Ethics, logic, history, social philosophy, philosophy of science, religion, culture and art. Faculty 6 full time. 19 graduate students enrolled.

Physics Nuclear physics, theoretical physics, cosmic radiation. Combined program with astronomy (astrophysics) offered. Faculty 11 full time. 32 graduate students enrolled.

Physiological Optics Prerequisites 60 hours of liberal arts, Master of Optometry degree. Program administered by the Division of Optometry. Faculty 4 full time. 8 graduate students enrolled.

Physiology Human, general. Prerequisites major in physiology, or a strong program in biology or chemistry. Administered by the Department of Physiology of the Medical School. Faculty 6 full time. 2 graduate students enrolled.

Psychology Particular emphasis in training clinical researchers, all fields. Prerequisites major in psychology, MAT, preliminary examination after 3 semesters, qualifying examinations after the fifth. Faculty 17 full time. 50 graduate students enrolled.

Sociology Social organization, disorganization, social psychology, history and theories, methods and statistics. Prerequisites undergraduate major in sociology. Faculty 10 full time. 31 graduate students enrolled.

Spanish and Portuguese Spanish language and literature or Latin American language and literature. Prerequisites experience in Spanish speaking areas, French and German. Faculty 6 full time. 23 graduate students enrolled.

Speech and Theatre Public address and forensics, drama and theatre, voice science, phonetics and speech pathology. Prerequisite undergraduate major in speech and theatre. Faculty 12 full time. 72 graduate students enrolled.

Zoology Genetics, experimental embryology, endocrinology, entomology, ecology. Faculty 11 full time. 53 graduate students enrolled.

NOTES

Some departments have seminars or required

courses for assistants and prospective teachers, while others have various forms of supervised teaching. With over 400 teaching assistantships, students have opportunities to develop teaching skills.

The Institute of Paper Chemistry

APPLETON, WISCONSIN

Chartered by the State of Wisconsin in 1929. First Ph.D. awarded in 1933. Receives nationwide support largely from pulp and paper industry. Objective is graduate education of men for positions of industrial leadership primarily in the pulp and paper field, program aimed at the development of a broad background in the several branches of the physical sciences and of engineering which underlie the technology of the pulp and paper industry. Academically it is affiliated with Lawrence College. Graduate degrees are granted to Institute students by Lawrence College upon recommendation of the Institute faculty to the Lawrence Board of Trustees. Direction is vested in a Board of Trustees composed of leading executives in the pulp and paper industry and representatives of Lawrence College. Administration rests with the Dean of the Institute.

Dard Hunter Paper Museum containing world's finest collection illustrating art of paper making from its invention to present.

Six buildings on a campus of 32 acres. Two dormitories for single students, dormitory apartment buildings for 28 married students.

6 Ph.D.'s awarded in 1956-7.

Residence requirements for doctorate minimum residence of two years, four years' study under guidance of Institute faculty is normally required.

Transfer students must demonstrate proficiency in any course offered for transfer, if required. Otherwise all courses must be taken in residence.

ADMISSION REQUIREMENTS

Bachelor's degree, usually in chemistry or chemical engineering. Majors in other sciences or engineering may qualify. Selection based on

scope and quality of preparation, recommendation of American Chemical Society and American Institute of Chemical Engineering with respect to undergraduate school. Five letters of recommendation and a personal interview. Recommended German, differential equations, two years of physics, GRE and Selective Service College Qualification Test. Apply to Dean of Admissions before April 1.

FEEES AND FIRST YEAR AID

Tuition—\$250 per term. Room—single men \$60 per term, apartments \$80 \$160 per term.

\$2,000 scholarship awarded to each first year student of U.S. citizenship admitted. Renewal for second year contingent upon satisfactory completion of first year's work. \$2,100 scholarship for third and fourth year. Married students with children receive additional \$500 each year. Scholarship extended for students who have completed three required mill experiences and are registered for summer term. Tuition deducted from each year's scholarship.

FIELDS OF STUDY FOR THE PH.D.

Academic Ph.D. is unspecified degree in physical sciences awarded on successful completion of program composed largely of advanced study in chemistry, physics, chemical engineering and independent research. Program embraces all departments. Reading knowledge of technical German required for admission to doctoral candidacy. Faculty: 35 full time, 6 part time. 50 graduate students enrolled.

Iowa State College of Agricultural and Mechanical Arts

AMES, IOWA

Graduate College

Graduate instruction had been available nearly a half century prior to the establishment of the Graduate Faculty in 1913 with authority to award the Ph.D. Graduate instruction is offered in various fields of agriculture, engineering, home economics, veterinary medicine, and the sciences.

Emphasis is placed upon the biological, physical and social sciences as a foundation for the applied.

Agriculture experiment station, engineering experiment station, industrial science research institute, statistical laboratory, veterinary research institute, veterinary medical diagnostic laboratory, veterinary medical clinic, institute for atomic research, Ames Laboratory of the A.E.C. Affiliations with state and federal research branches and with Argonne National Laboratory in Illinois.

Men and women. State control. Summer courses but no evening courses. 119 Ph.D.'s awarded in 1956-7.

Residence requirements for doctorate: a minimum of three years spent on full time graduate study at least one half of which is to be in residence at the Iowa State College.

Faculty of Veterinary Medicine administers course leading to V.M.D.

ADMISSION REQUIREMENTS

Selection is made from applicants who have graduated in the upper one half of their class from institutions whose requirements for the baccalaureate degrees are substantially the equivalent of those at Iowa State College.

Reading knowledge of two foreign languages required in all departments. French, Russian and German are approved for this purpose.

Apply on blanks obtained from either Dean of the Graduate College or the Registrar. Admission can be granted at beginning of any quarter.

FEEES AND FIRST YEAR AID

Tuition—\$77 per quarter for both in state and out of state students.

Available to first year students. Teaching and research stipends in many departments ranging from \$100 to \$175 per month. Apply to departmental office concerned.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Engineering. Work may be taken for the Ph.D. as a divided major with departments offering work in related fields for this degree. M.S. is given in soil and water conservation, agricultural machines, agricultural power, agricultural structures, and rural electrification. Prerequisites: undergraduate curriculum in agricultural engineering substantially equivalent to

that required at Iowa State College Faculty 9 full time 18 graduate students enrolled

Agronomy Crop production, crop breeding soil physics, soil fertility, soil bacteriology, soil morphology and genesis, soil management, agricultural climatology Prerequisites undergraduate curriculum substantially equivalent to that recommended for pre graduate training at Iowa State College Faculty 16 full time 83 graduate students enrolled.

Animal Husbandry Breeding, nutrition, and reproduction in beef or dairy cattle, sheep, or swine, an M.S. is also offered in meats Prerequisites undergraduate program in general animal husbandry, dairy husbandry and/or related sciences necessary for the pursuance of the particular graduate field chosen Basic courses in chemistry, mathematics, and zoology are helpful. Faculty 12 full time 65 graduate students enrolled

Bacteriology Physiological, systematic, soil, dairy, veterinary, sanitary, food, and household bacteriology Prerequisites at least one thorough course each in general bacteriology, chemistry (including inorganic and organic), and physics, physiological and bio physical chemistry are advised, for major in soil bacteriology, courses in soils substantially equivalent to those required of undergraduate majors in agronomy, for majors in dairy bacteriology courses in dairy industry equivalent to those required of undergraduate majors in dairy industry, for majors in physiological bacteriology, courses in bio-chemistry, physics at least one year of organic chemistry, a minor in chemistry Recommended minor in physiological, physical, bio physical, organic, and sanitary chemistry, bio chemistry, mathematics, and physics Faculty 3 full time 9 graduate students enrolled

Botany Plant ecology, morphology, mycology, pathology, physiology, systematic, and economic botany Prerequisites 30 undergraduate credit hours in botany, with supporting work in basic and applied science, upon recommendation of head of department, courses in bacteriology, zoology, farm crops, or horticulture may be substituted in part for botany, for major in plant physiology, courses in inorganic and organic chemistry, physics, and mathematics are desirable, for majors in plant pathology courses in bacteriology and organic chemistry, for major in systematic botany, prerequisites in general mor

phology Recommended minors in bacteriology, chemistry, farm crops, forestry genetics, geology, horticulture, physics, soils, zoology, and entomology Faculty 13 full time 38 graduate students enrolled

Ceramic Engineering Ceramics and ceramic engineering Prerequisites a curriculum in ceramic engineering, ceramic technology, engineering, or physical science equivalent to that required of undergraduates of Iowa State College Faculty 2 full time 3 graduate students enrolled.

Chemical Engineering Prerequisites undergraduate curriculum substantially equivalent to that offered in chemical engineering at Iowa State College Faculty 5 full time 27 graduate students enrolled.

Chemistry Inorganic, analytical, physical, or organic, and bio chemistry, and combinations and specializations within these general areas, such as physical chemical metallurgy, bio organic, bio physical, food and dairy, and household and textile chemistry Combined program with Institute for Atomic Research—analytical chemistry, calculus and physics are required, also combined with Food Technology program Prerequisites undergraduate work in chemistry, mathematics, and physics substantially equivalent to that required for major in chemical technology at this institution Faculty 30 full time 220 graduate students enrolled

Civil Engineering Soil, structural, sanitary, highway engineering Prerequisites curriculum substantially equivalent to that required for undergraduate major in civil engineering at this institution, including courses necessary for the particular field chosen. Faculty 7 full time 44 graduate students enrolled

Dairy and Food Technology Dairy bacteriology, dairy chemistry Prerequisites curriculum substantially equivalent to that required for undergraduate major in dairy industry at this institution. Faculty 10 full time 33 graduate students enrolled.

Economics and Sociology Agricultural economics, consumption economics, industrial economics, and rural sociology Prerequisites undergraduate work in economics, mathematics, statistics, sociology and other social science and technical subjects substantially equivalent to a minor in this department at this institution Faculty 20 full time. 80 graduate students enrolled.

Electrical Engineering Prerequisites under graduate work substantially equivalent to that required for a major in electrical engineering at this institution Faculty 5 full time 33 graduate students enrolled

Food and Nutrition Prerequisites at least 50 quarter credits of undergraduate work, including food preparation elementary experimental cookery dietetics nutrition physics human physiology bacteriology and chemistry Faculty 5 full time 18 graduate students enrolled

Food Technology To be combined with Dairy programs

Forestry Silviculture wood technology Work may be taken for the Ph D as a divided major with departments offering work in related fields Prerequisites forestry credits substantially equivalent to those required of undergraduate students in this institution Faculty 4 full time 12 graduate students enrolled

Genetics Prerequisites thorough undergraduate curriculum in agriculture or in a biological science Faculty 2 full time 9 graduate students enrolled

Geology Work may be taken for the Ph D as a divided major with departments offering work in related fields for this program Prerequisites students wishing to major in geology should have completed the following courses physical historical structural and economic geology mineralogy petrology summer field work and either petroleum geology and invertebrate paleontology or optical mineralogy and economic geology metallic and non metallic mineral deposits Faculty 4 full time 15 graduate students enrolled

Home Economics Education Prerequisites fundamental knowledge of psychology education sociology and home economics Faculty 4 full time 40 graduate students enrolled (including many summer students)

Horticulture Pomology vegetable crops floriculture and nursery crops Prerequisites courses covering the general field of horticulture or botany and the underlying sciences Faculty 6 full time 6 graduate students enrolled

Household Equipment Work may be taken for the Ph D as a divided major with departments offering work in related field Prerequisites beginning food courses 24 quarter credits in physics (mechanics electricity heat) chemistry (general organic and quantitative meth-

od), household equipment Recommended general background in home economics Faculty 3 full time 5 graduate students enrolled

Industrial Engineering Engineering valuation Prerequisites curriculum substantially equivalent to that required of undergraduate students in engineering at this institution Faculty 1 full time 6 graduate students enrolled

Institution Management Work may be taken for the Ph D as a divided major with departments offering work in related fields Prerequisites 25 quarter credits in home economics of which ten should be in institution management seven in food and nutrition fundamental training in institution accounting chemistry physics and bacteriology is required Faculty 4 full time 3 graduate students enrolled

Mathematics Applied mathematics Prerequisites fifteen quarter credits of work in mathematics beyond calculus including differential equations and theory of equations Faculty 12 full time 38 graduate students enrolled

Mechanical Engineering Work may be taken for the Ph D as a divided major with departments offering work in related fields Prerequisites undergraduate curriculum equivalent to that required of majors in the department at this institution Faculty 3 full time 11 graduate students enrolled

Metallurgy Organized on an interdepartmental basis with departments of chemistry, chemical and mining engineering, mechanical engineering and physics Prerequisites suitable undergraduate curriculum such as chemical engineering, chemistry mechanical engineering metallurgical engineering metallurgy mining engineering, or physics See catalogue for details Faculty 7 full time 21 graduate students enrolled

Physics Theoretical and experimental investigations in such fields as solid state physics nuclear physics and bio physics Closely associated with Institute for Atomic Research Prerequisites bachelor's degree with sufficient emphasis on physics chemistry and mathematics Faculty 15 full time 74 graduate students enrolled

Poultry Husbandry Nutrition, breeding, physiology and poultry products technology Prerequisites fundamental training in biology chemistry mathematics statistics and other related fields Faculty 4 full time 5 graduate students enrolled

Statistics Prerequisites undergraduate curric

ulum essentially equivalent to the curriculum in science at this institution, with a year of calculus and a knowledge of statistical theory and methods as contained in courses on theory and on statistical methods for research workers Faculty 8 full time 31 graduate students enrolled

Theoretical and Applied Mechanics Prerequisites curriculum substantially equivalent to that required of undergraduate students at this institution Faculty 3 full time 17 graduate students enrolled

Vocational Education Agricultural, industrial, and rural education, vocational guidance Prerequisites curriculum substantially equivalent to one of the undergraduate curricula in education at this institution, proof that the student ranks above average in scholastic ability and promise of vocational competency Faculty 8 full time 130 graduate students enrolled, including many in summer only

Zoology and Entomology Embryology, morphology, ecology, taxonomy, physiology (comparative and insect), protozoology, parasitology, entomology (general, taxonomic, economic, and medical), apiculture, fishery management, and wildlife management Prerequisites at least two years of zoological courses, for part of which other biological courses may be substituted Comprehensive zoology and general chemistry are required, and usually organic chemistry Faculty 14 full time 61 graduate students enrolled

State University of Iowa

IOWA CITY, IOWA

Graduate College

The Graduate College, founded in 1900, is under the control of a nine member State Board of Regents.

Special features include a Writers Workshop for original writing in novel and poetry, natural history museum, five hospitals child welfare research station bureau of educational research, institute for agricultural medicine, institute of hydraulic research, bureau of labor and management, institute of public affairs, institute of gerontology radio station, social service unit, televi-

sion center, university theatre Dormitories and facilities for married students are available

Men and women Summer courses 117 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate at least two academic years must be spent in residence, one of which must be at this Institution

ADMISSION REQUIREMENTS

Bachelor's degree, two foreign languages Statistics may be substituted, if approved by the Dean

Apply at any time to the Registrar

FEES AND FIRST YEAR AID

Tuition—in state \$130, out of state \$130 Room—\$700 to \$775 for 9 months

Loan funds, scholarships, fellowships, and assistantships available Apply at any time (most appointments are made by April 1) to Graduate College or Registrar

FIELDS OF STUDY FOR THE PH D

Accounting Prerequisite major in accounting preferred, but commerce majors acceptable, research tool examinations in business statistics and economics or logic and scientific method, written comprehensive examinations in five areas Faculty 5 full time, 4 part time 18 graduate students enrolled

Art Art history theory, criticism, with considerable work in studio courses Prerequisites

B average in undergraduate work, major in art—preferably with courses in humanities, ordinarily, French or German Recommended European travel Faculty 19 full time, 14 part time 87 graduate students enrolled

Bacteriology General bacteriology and physiology, virology, immunology Prerequisites 32 40 semester hours of biology, 18 25 of chemistry, 8 of physics, 8 12 of mathematics 8 of foreign languages, 2 5 or better GPA for undergraduate work Faculty 7 full time, 1 part time 10 graduate students enrolled

Botany Plant histology, plant morphology, plant physiology, plant taxonomy, mycology Recommended 16 semester hours of botany, 1 year of chemistry, 1 year of a related science (zoology, bacteriology, geology, etc.) Faculty 6 full time, 17 part time 22 graduate students enrolled

Chemical Engineering Barrier separations,

molecular flow, adsorption phenomena, reaction kinetics Prerequisites primarily a BS in chemical engineering, MS preferred Chemistry majors need approximately 30 to 40 hours of engineering subjects to become eligible candidates Industrial experience preferred Faculty 2 full time, 4 part time 4 graduate students enrolled

Chemistry Analytical, inorganic, organic, physical chemistry Optional work permitted in physics, mathematics, and biochemistry Prerequisites 2 semesters each of general chemistry, qualitative analysis, quantitative analysis, organic chemistry and physics, 1 semester each of qualitative organic chemistry and instrumental analysis, 4 semesters of English and the humanities, mathematics through integral calculus, reading tests in French or German Faculty 14 full time 82 graduate students enrolled

Child Welfare Child psychology, child development and guidance, parent and family life education, physical growth Minor in general psychology required of majors in child psychology Prerequisite bachelor's degree Recommended courses in biological science experimental psychology, college algebra, trigonometry and statistics sociology or anthropology, or education Faculty 14 full time, 3 part time 28 graduate students enrolled

Civil Engineering Structures soil mechanics, hydraulic engineering (as a minor, if a major, the program is administered by Department of Mechanics and Hydraulics) Prerequisites stand ard courses required for a BS in civil engineering scholastic standing or record that shows likelihood of high achievement Recommended practical experience in construction or design Faculty 5 full time, 2 part time 12 graduate students enrolled

Economics Economic theory international trade, public finance Prerequisites undergraduate major in economics or related fields of social science preparation in economic theory, money and banking, statistics Recommended courses in mathematics sociology, philosophy Faculty 5 full time 17 graduate students enrolled

Education Educational psychology, elementary secondary, adult, and special education, general educational administration, tests and measurements, statistical methods, guidance and counseling, remedial reading, history and philosophy of education, comparative education Combined programs with liberal arts departments,

commerce, nursing, engineering Prerequisites typical courses required for an initial teaching certificate, departmentally determined language requirement, but in most areas a reading knowledge of one foreign language, previous scholarship record above average, three recommendations on probable success in graduate study Recommended successful teaching experience Faculty 29 full time 145 graduate students enrolled

Electrical Engineering Electronics, power Prerequisites BS in electrical engineering Most candidates have a master's degree Statistics accepted for one language Faculty 6 full time, 3 part time 12 graduate students enrolled

English English literature American literature creative writing linguistics Combined program in American Civilization (history, sociology religion art, etc.) Admission to candidacy requires reading knowledge of Old and Middle English or Greek or Latin, familiarity with general linguistics and history of English language Faculty 27 full time, 4 part time 158 graduate students enrolled

General Business Business finance, insurance money and banking regulated enterprise, transportation statistics Candidates must take two, but not more than three of the five fields in other departments Prerequisites undergraduate preparation including at least 20 semester hours of credit in economics and/or commerce courses Recommended mathematics and social sciences Faculty 8 full time, 10 part time 24 graduate students enrolled

Geography Economic, urban political, and physical geography Prerequisite undergraduate major in geography, or equivalent Recommended social science and earth science, knowledge of statistics and German Faculty 5 full time 15 graduate students enrolled

Geology General geology, paleontology and stratigraphy geomorphology, mineralogy and petrology, economic geology sedimentology Prerequisites bachelor's degree with a major in geology including a field course and at least one college year in each of the following—mathematics chemistry, physics, geology Recommended additional courses in mathematics chemistry, physics, and zoology Faculty 6 full time, 2 part time 40 graduate students enrolled

German German literature, linguistics Prerequisites undergraduate major in German, with

at least one additional foreign language (Latin strongly recommended), familiarity with English, French, and classical literatures, evaluation of graduate student in his course work, especially in seminars Latin or Greek may be required of students specializing in classical German literature or linguistics Recommended German philosophy, history of Germany, study of certain special aspects of English, French, and classical literature Faculty 5 full time 7 graduate students enrolled

Hospital Administration Administration of hospitals and hospital related institutions, teaching, research, and research administration in the field of health care Prerequisites preferably an undergraduate major in the general business administration field, but students from other fields of social science, liberal arts, natural science, and law are admitted, admission test for graduate study in business Recommended courses in accounting, statistics, management, psychology, sociology, and the humanities

Industrial and Management Engineering Engineering education, work method measurement, operations research, systems design Prerequisites acceptable undergraduate training in engineering, mathematics, and physics, two years of significant industrial engineering practice, outstanding scholastic ability Recommended philosophy, psychology, sociology, 3 years of additional industrial engineering practice Faculty 2 full time, 2 part time 18 graduate students enrolled

Journalism Ph.D. is given in 'Mass Communications' Programs emphasize the major media of communications An inter departmental degree Prerequisites major in journalism at bachelor's or master's level at least one year of experience of satisfactory professional caliber in commercial mass communications M.A. holders must have a 3.0 GPA, letters of recommendation requested directly by the Department Faculty 13 full time, 2 part time 47 graduate students enrolled

Labor and Management Prerequisites courses required by this Institution of persons earning bachelor's degree in this Department Recommended courses in psychology engineering, and mathematics, with work experience in business Faculty 4 full time, 1 part time 7 graduate students enrolled

Marketing Prerequisites M.A. in marketing or equivalent, tool examination in any two of

the following areas—statistics, accounting, mathematics, scientific method Faculty 5 full time, 4 part time 11 graduate students enrolled

Mathematics and Astronomy Actuarial science, applied mathematics astronomy, pure mathematics statistics, teaching of mathematics and astronomy Prerequisite an adequate background in mathematics Faculty 12 full time, 38 part time 52 graduate students enrolled

Mechanical Engineering Thermodynamics heat and mass transfer, materials, applied mechanics Prerequisites acceptable undergraduate training in mechanical engineering mathematics, and physics, outstanding scholastic ability Faculty 7 full time 6 graduate students enrolled

Mechanics and Hydraulics Hydraulic engineering, mechanics of fluids, mechanics of solids Prerequisites bachelor's degree in engineering, graduation in upper quarter of class, any two languages, other than English in which there is significant literature in the major field Recommended BS in civil or mechanical engineering Faculty 5 full time, 16 part time 31 graduate students enrolled

Music Composition theory, music education, musicology, performance Prerequisites adequate undergraduate training in music theory, history of music and applied music informal placement examination in major area Students majoring in music education must have had previous preparation in music methods and materials in elementary and secondary education Recommended some background in related fine arts and history Faculty 23 full time, 19 part time 69 graduate students enrolled

Nutrition in Internal Medicine Some candidates work in combination with Home Economics Department Prerequisites satisfaction of course requirements of ADA for membership (including chemistry through biochemistry, human physiology beginning microbiology, economics, sociology and psychology, food preparation and service basic nutrition and dietetics, diet therapy), language proficiency to be demonstrated during work, completion of a hospital internship in dietetics (an unwritten requirement) Recommended quantitative chemistry, mathematics through calculus, physics, experience in the practice of dietetics or in teaching nutrition and dietetics Faculty 18 (including 16 in Internal Medicine Department) 19 graduate students enrolled

Office Management and Business Education Business education for teachers, office management Program may be combined with any other department in the College of Commerce Prerequisites undergraduate major in commerce with concentration in business education or office management, two research tools (selected from economic theory, statistics, or accounting) Recommended teaching experience for business education Faculty 3 full time, 2 part time 6 graduate students enrolled

Pharmacology Enzymology, cardiovascular analgesia, neuromuscular and central nervous system Prerequisites BS with courses in chemistry, physics, and biology, satisfactory scholastic record Faculty 5 full time, 1 part time 7 graduate students enrolled

Pharmacy Pharmaceutical chemistry, hospital pharmacy Combined programs offered with Departments of Pharmacology Bacteriology and Commerce Prerequisites preferably an undergraduate major in pharmacy, but well qualified students may be admitted Students with undergraduate degrees from college of pharmacy acceptable only Recommended physical chemistry, mathematics, including differential equations Faculty 7 full time, 1 part time 16 graduate students enrolled

Philosophy Metaphysics theory of knowledge, history of philosophy, philosophy of science, logic, ethics Prerequisites undergraduate minor (or equivalent) in philosophy, background in humanities, mathematics, social or natural science, French and German and others if needed Recommended generally a wide knowledge in fields other than philosophy Faculty 4 full time, 1 part time 10 graduate students enrolled

Physical Education—Men Physical rehabilitation recreation Prerequisites anatomy and kinesiology, human physiology, personal hygiene, school or community hygiene gymnastics swimming, coaching of football, basketball, baseball, and track and field athletics, minimum of 30 hours of undergraduate work in physical education Recommended general chemistry, general physics, zoology, college algebra, trigonometry Faculty 14 full time, 5 part time 33 graduate students enrolled

Physical Education—Women Measurement, correctives, kinesiology, methods of teaching, curriculum, administration, research Prerequisites preferably an undergraduate major in physical

education, but at least an adequate background in anatomy, kinesiology, hygiene, physiology, varied physical education activities, recreation leadership course or experience, choice of one language (may be taken during first year of doctoral study), at least one semester of statistics, research experience at MA level (may be taken during first year of doctoral study) Recommended methods and principles organization and administration of physical education, correctives, measurement Faculty 11 full time, 6 part time 20 graduate students enrolled

Physics Cosmic rays atmospheric, low energy nuclear, theoretical, and solid state physics Prerequisites BA or BS, with a major in physics, superior scholarship Faculty 11 full time, 1 part time 42 graduate students enrolled

Physiology Neuromuscular growth, cardiovascular, biologic rhythms, environment, physical fitness, digestion and absorption Prerequisites basic courses in biology chemistry, physics, and mathematics GRE desirable Recommended undergraduate courses in biology beyond a basic course, mathematics through calculus Faculty 9 full time, 6 part time 25 graduate students enrolled

Political Science International relations, public administration, public law, political theory Courses in related departments strongly recommended Prerequisites American government, comparative foreign government Recommended equivalent of an undergraduate major in social science Faculty 10 full time 26 graduate students enrolled

Psychology Experimental, clinical, and personnel psychology Combined program with experimental child psychology and educational psychology Prerequisites minimum of 21 hours in psychology, including experimental psychology (3 hours) and statistics (3 hours), 6 hours of college mathematics, 12 hours each of natural science and social science, one foreign language, GRE Recommended psychology of adjustment, social psychology Faculty 7 full time, 7 part time 48 graduate students enrolled

Religion Biblical studies, theology, history of religion. Combined program with classics, history and philosophy Prerequisites courses designed to gain a grounding in Biblical studies, history and philosophy (theology) of religion, especially Judaism and Christianity, at least 2 languages (choice dependent on the area of concentration)

Faculty 5 full time 10 graduate students enrolled

Romance Languages Spanish, French, minor also allowed in German Prerequisites see catalog Student is encouraged to take courses outside his specialty in cognate field Faculty 10 full time, 32 part time 33 graduate students enrolled

Sanitary Engineering Water, sewage, and industrial waste treatment. This is a cooperative program by the Departments of Civil Engineering Hygiene, and Preventive Medicine Prerequisites preferably a BS in civil engineering, but students from other branches of engineering and, in special cases, students with a background in chemistry bacteriology, and mathematics, may be accepted, high scholastic standing in undergraduate work, or evidence of ability as demonstrated by professional accomplishments Recommended professional experience in the field, such as design, research or public health work Faculty 4 full time, 1 part time 4 graduate students enrolled

Sociology and Anthropology Social anthropology, criminology and penology, social psychology institutions and social problems population and human ecology Prerequisites undergraduate major in sociology anthropology (or its equivalent) including personality, collective behavior, elementary social statistics and methods of social research reading knowledge of one foreign language which will be functional for scholarly and research purposes tool subject examination over area of social statistics, history of sociology, advanced sociological theory, and two graduate seminars—one in special area of theory and one in special area of research methodology Recommended field work experience for students on joint sociology anthropology program, summer in service work experience for those in criminology penology program, all others to have experience in empirical research Faculty 9 full time, 7 part time 37 graduate students enrolled

Speech and Dramatic Art History of theatre, playwriting, experimental aesthetics, audience response, history of oratory, rhetorical criticism, speech education. Prerequisites general background in speech, dramatic art, and radio television, minimum GPA of 3.0 Faculty 21 full time, 14 part time 81 graduate students enrolled

Zoology Morphology or anatomy, general physiology, comparative physiology, parasitology, protozoology, ecology, entomology, descriptive and experimental embryology, endocrinology, histology, cytology, medical entomology, genetics, evolution, aquatic biology, field biology, comparative behavior Prerequisites general zoology, comparative vertebrate anatomy, invertebrate zoology, vertebrate embryology, general physiology, one year each of chemistry and physics GPA 2.5 or more, comprehensive examination Recommended mathematics through calculus

NOTES

One or more courses designed to increase the effectiveness of the doctoral candidate as a college teacher, are offered in departments granting the Ph D

Johns Hopkins University

BALTIMORE, MARYLAND

Graduate Programs in the Faculty of Philosophy

Established in 1876, this is the first institution of higher education in the United States to emphasize University methods as contrasted with collegiate Its graduate division has no official distinctive name but is generally designated as above There is no system of grades or credits

Allied divisions awarding doctorates include the School of Advanced International Studies (see separate information below) in Washington, D.C., the School of Engineering, which grants the Eng D., and the School of Hygiene and Public Health, D Sc and D P H

Residence for single men, apartment building for single women and married couples Cafeteria

Special collections of economic classics, modern German drama, French drama, linguistics, architectural classics, orientalia Swiss history, early Maryland items, history of medicine, Lanier manuscripts Other metropolitan libraries

Archaeological museum, coins and bronzes, two Van De Graaff generators, mass spectrometer, ultra centrifuges, wide range automatic

computing calorimeter, range of automatic spectrophotometric equipment, high voltage X ray, Institute for Cooperative Research, field work in oceanography through Chesapeake Bay Institute, research in micronutrients, affiliation with Brookhaven National Laboratory, valuable collections for study of Ancient Orient, geology field camp

Men and women Summer and evening courses Private control. 66 Ph D s awarded 1956 7 Residence requirement for doctorate one year minimum

ADMISSION REQUIREMENTS

Fitness for advanced study in field chosen Most students have bachelors degree GRE recommended

Apply to the Director of Admissions, Johns Hopkins University, preferably in the first term of the senior year in college Later applications will be considered if financial assistance is not required

FEES AND FIRST YEAR AID

Tuition—\$1,000 Room—\$280 \$400 Board—\$450 \$500

Full tuition fellowships accompanied in some departments by cash stipend, for part time teaching or research Limited number of larger fellowships with cash stipends ranging up to \$3,000 the latter usually reserved for students in upper years Apply between October 1 and March 1

FIELDS OF STUDY FOR THE PH D

Aesthetics of Literature Interdepartmental program 7 graduate students enrolled

Anthropology Biology of man and other primates, including their anatomy development, physiology, ecology, taxonomy, and evolution Faculty 1 full time 2 graduate students enrolled

Biochemistry See Biology and Chemistry

Bioclimatology See Geography

Biology Growth and development, cytogenetics, genetics, and evolution, physiology and biochemistry Prerequisites fundamentals of biology, inorganic and organic chemistry, physics Recommended calculus, statistics, analytical and physical chemistry and geology (paleontology) Faculty 16 full time, 2 part time 47 graduate students enrolled

Biophysics Molecular biology, physicochemical mechanisms of biological processes Recom

mended general biology and one additional subject in biology, general physics and two additional subjects in physics, inorganic and organic chemistry, differential and integral calculus, some of the following—physical chemistry, psychology, introductory biophysics, additional mathematics, reading ability in a second language. Faculty 5 full time 7 graduate students enrolled

Business and Industrial Management This is a combined program between the Faculty of Philosophy and the School of Engineering 3 graduate students enrolled

Chemistry General training in all major branches, special opportunities for study in the following synthetic organic chemistry, natural products, organic biochemistry, mechanisms of reactions, reaction kinetics, catalysis, crystallography, molecular structure, nuclear chemistry, structural inorganic chemistry colloid chemistry, electro-chemistry, calorimetry, thermodynamic measurements, spectroscopy, theoretical chemistry Prerequisite adequate knowledge of chemistry physics, and mathematics Recommended reading knowledge of French and German Faculty 14 full time, 1 shared with geology 45 graduate students enrolled

Classics Greek and Latin languages and literatures, Greek and Latin epigraphy, ancient history, and classical archaeology Prerequisites general proficiency in Greek and Latin, 3 years each of college Latin and Greek. Faculty 4 full time 10 graduate students enrolled

Comparative Literature Combined program of Romance languages and English

Crystallography Crystal optics morphology, and structure Combined program with geology or chemistry Prerequisite adequate preparation in mathematics, chemistry, and physics Faculty 1 full time 1 graduate student enrolled

Economics See Political Economy

Education History and philosophy of education, educational psychology, guidance, administration, secondary education, teacher education Prerequisites basic knowledge of one or more fields related to education, such as history, philosophy, psychology, or political science Faculty 4 full time, 2 shared 14 graduate students enrolled

English Literature the Middle Ages, 16th and 17th centuries, Restoration and 18th century, Romantic period, Victorian period, American. Linguistics Proto-English (and its kindred

tongues), Old English, Middle English, modern English (including American) Prerequisites liberal arts background, with good knowledge of English and one foreign language Faculty 6 full time 19 graduate students enrolled

Geography Human geography, political geography and international relations, geographical economy, including tropical development, problems of population, physical climatology and meteorology Combined program in bioclimatology Prerequisite broad acquaintance with the physical earth sciences and the social sciences Faculty 2 full time, 1 shared with Civil Engineering 9 graduate students enrolled.

Geology Mineralogy, structural and field geology, paleontology and stratigraphy, petrography and petrology, geochemistry and geophysics Prerequisite scientific background adequate for advanced study, based upon mathematics, physics, chemistry, biology, and geology Faculty 6 full time, 1 shared with chemistry 22 graduate students enrolled

German Literature Old and Middle High German, Renaissance and Baroque, the Age of Goethe, 19th century, modern, Anglo-German literary relations, American-German literary relations German philology Combined program with history philosophy classics and aesthetics of literature Prerequisites general education, including knowledge of spoken and written German, acquaintance with historical and literary background Faculty 3 full time, 10 graduate students enrolled.

History American intellectual history, economic history, Renaissance Italy England and France in the Middle Ages Southern history and modern American history modern Germany and the diplomatic history of modern Europe, Chinese and Inner Asian history England in the 18th, 19th, and 20th centuries,—foreign relations of the United States Combined program in history of medicine (with the School of Medicine) and in the history of science (with other departments) Recommended a good reading knowledge of French and German. Faculty 7 full time, 1 lecturer 35 graduate students enrolled.

History and American Literature Combined program between history and English. 1 graduate student enrolled.

Human Genetics Combined program. 1 graduate student enrolled.

Humanistic Studies Combined program. 1 graduate student enrolled

International Studies Combined program between departments 2 graduate students enrolled

Mathematics Analysis, particularly differential equations, functional analysis, operator theory, algebraic geometry, abstract algebra, Lie group theory, group representations, differential geometry, algebraic topology, algebraic numbers, applied mathematics Prerequisites thorough knowledge of advanced calculus, including infinite series, differential equations, vector analysis, and a few courses beyond this level Recommended thorough background in the physical sciences and a reading knowledge of French or German, one or more of the following courses—complex variables, basic analysis, introductions to modern algebra Faculty 14 full time 18 graduate students enrolled.

Meteorology and Fluid Mechanics Combined program between departments 2 graduate students enrolled

Oceanography Physical and chemical oceanography, dynamics of circulation, turbulence and diffusion, interaction of ocean and atmosphere, polarographic techniques for sea water analysis, biochemical problems relating to phytoplankton growth. Prerequisites background in sciences or engineering including mathematics, physics chemistry, biology, and geology Faculty 5 full time 5 graduate students enrolled.

Oriental Seminary Archaeology, history and literature of the Ancient Orient, the Bible Jewish and Islamic studies, Sematic philology Prerequisites general background in history, some foreign language Faculty 2 full time, 2 part time 35 graduate students enrolled.

Philosophy History of philosophy, epistemology, ethical theory, systematic philosophy, aesthetics Combined program with aesthetics of literature, history of ideas, history of science philosophy of science Prerequisites broad knowledge of the history of western civilization, one of the biological or physical sciences, acquaintance with the chief topics and problems of philosophy, an introduction to logic and scientific methods, together with either aesthetic or ethical theory Faculty 4 full time, 1 shared with Education. 19 graduate students enrolled.

Physics Atomic and molecular physics, with specialties such as gas discharges, spectroscopy, solid state and low temperature physics, infrared,

X rays, nuclear physics high energy physics, theoretical physics, electronics Prerequisites good background in physics chemistry, and mathematics, but specific deficiencies can be removed after admission Recommended knowledge of French or German Faculty 14 full time, 1 part time 80 graduate students enrolled.

Physiological Chemistry Combined program with the School of Medicine 2 graduate students enrolled

Physiology Combined program with the School of Medicine 2 graduate students enrolled

Political Economy Price and income theory monetary theory, development, growth and fluctuations, labor economics economic history, Soviet economics, statistics and economics methodology, fiscal policy, international economics Combined program with international studies Prerequisites broad background of liberal arts, including fundamentals of economics, elementary statistics, differential calculus, a foreign language Faculty 8 full time, 2 lecturers 24 graduate students enrolled

Political Science Politics, public administration, theoretical and legal structure of political organization, constitutional law and development, international law and relations comparative government Prerequisites broad background of basic work in political science, two foreign languages Faculty 6 full time 22 graduate students enrolled

Psychology History and systems, experimental methods, sensation and perception, motivation, learning and thinking, personality and social psychology Prerequisites good background of general knowledge in the biological and physical sciences, a foreign language Faculty 5 full time, 1 shared 18 graduate students enrolled

Romance Languages French, Spanish, and Italian language and literature, Romance philology Combined program in aesthetics of literature Prerequisite good background in at least one of the three major Romance fields Recommended as much experience as possible in the major Romance fields Faculty 8 full time 17 graduate students enrolled

NOTES

Opportunities for teaching undergraduates and evening school students, supervised by senior members of the faculty, annual conference

on problems of teaching chemistry—high school, college, and university

School of Advanced International Studies WASHINGTON, D C

This institution was established in 1943 by the Foreign Service Foundation and was incorporated in Johns Hopkins University in 1950 It trains men and women for careers of international service with the government, private business, or non governmental organizations There is no system of grades or credits

A main building at 1906 Florida Ave., N.W., provides classrooms, dining hall, lounge, and dormitory for approximately 40 men An adjacent building houses the Foreign Service Educational Foundation, which continues to give strong support to the School

Library contains 23 000 volumes in diplomacy, international relations, and allied fields The School maintains a center in Italy, in close association with the University of Bologna, for area training in Western Europe (open to American and European students) Another center is maintained in collaboration with the University of Rangoon in Burma, where research may be undertaken in Burma or in other countries in that area. Recently activities were extended to Indonesia through an arrangement with the Gadjah Mada University, Jogjakarta

Men and women Private control Summer courses 1 Ph.D. awarded in 1956-7

Residence requirement for the doctorate one year minimum

ADMISSION REQUIREMENTS

College graduation, with adequate preparation in the social sciences and modern foreign languages Students with legal, scientific, and engineering preparation also considered

Apply to Office of the Registrar, 1906 Florida Ave., N.W., Washington, D.C., not less than 30 days prior to registration

FEES AND FIRST YEAR AID

Tuition—\$1,000 (\$260 for summer) Room—\$225 \$300 for men, \$60 for summer session. No rooms available for women.

Three fellowships of \$2,300 each, five of \$1,800 each, and two of \$1,500 each, available to first year students on a competitive basis Also

a number of smaller scholarships and grants on basis of need and merit. Fellowships and scholarships for study at the Bologna Center also available.

FIELDS OF STUDY FOR THE PH D

Area Studies Africa Asia, Europe, Middle East Faculty Washington—7 full time and 21 part time, Bologna—3 full time and 12 part time, Rangoon—1 full time Graduate students enrolled 76 in Washington, 46 in Bologna, 3 in Rangoon

Diplomacy and International Relations

Kansas State College of Agriculture and Applied Science

MANHATTAN, KANSAS

The Graduate School

A standing committee on graduate work was created in 1886, although graduate instruction had been offered and a few masters degrees had been granted earlier. Ph.D. first offered in 1933.

Research carried on through, or in close cooperation with, the well equipped facilities of the Agricultural and Engineering Experiment Stations.

A land grant institution with summer courses and a limited number of evening courses. 31 Ph.D.s awarded in 1956-7.

Required for the Ph.D. are at least three years, of two semesters each, of study beyond the bachelor degree. One year of this must be spent in residence at the college.

ADMISSION REQUIREMENTS

Graduation from an institution whose requirements for bachelor's degrees are substantially equivalent to Kansas State College. Undergraduate average of B or better in the junior and senior years. Undergraduate training substantially equivalent to that given by K.S.C. in the specific subject matter field in which the applicant expects to do graduate work. Also, undergraduate training in closely related or supporting subjects must be adequate to sustain advanced work in the field of applicant's choice.

Apply at least one month before expected date of enrollment to the Dean of the Graduate School.

FEES AND FIRST YEAR AID

Tuition—in state, \$104 per semester, out of state, \$154. Rooms \$20-\$25 per month for men, \$25-\$30 for women. Board \$50-\$65 per month.

Research and teaching assistantships with stipends ranging from \$1,170 to \$2,040. Assistants pay tuition at in state rate and may carry 10-12 credit hours per semester. Apply not later than April 1 to the Dean of Graduate School.

FIELDS OF STUDY FOR THE PH D

Agricultural Economics Prerequisites: B.S., B average or better last two years of undergraduate work, 18 semester credit hours of undergraduate economics. Faculty 26 full time, 2 graduate students enrolled.

Agronomy Crop production, physiology and ecology, pasture management, plant breeding and genetics, weed control, soil chemistry, fertility, physics, management, and classification, dryland farming, irrigation, wind erosion. Combined program with genetics. Prerequisites: college algebra, trigonometry, physics, inorganic and organic chemistry, general botany, entomology, soil, and farm crops. B.S. in Agriculture or in Science with some agricultural experience. Faculty 41 full time, 18 part time, 15 graduate students enrolled.

Animal Breeding Genetics, animal breeding, statistics, biochemistry, physiology, and zoology. Administered jointly by Departments of Animal Husbandry, Dairy Husbandry, and Poultry Husbandry. Prerequisites for admission: elementary genetics, college algebra, physics, general and organic chemistry, general botany, general zoology, six additional hours of advanced biological sciences and six hours of production or management courses in fields of animal, dairy or poultry husbandry. Faculty 6 full time, 2 graduate students enrolled.

Animal Nutrition Biochemistry, physiology, bacteriology, endocrinology, statistics and anatomy. Combined program with Departments of Animal Husbandry, Dairy Husbandry, Poultry Husbandry, Chemistry and Veterinary Physiology. Prerequisites: (1) 6 hours credit in animal production courses, (2) biology, bacteriology, zoology and histology or cytology, (3) college

algebra and trigonometry, (4) physics, (5) qualitative, quantitative, and organic chemistry Faculty 15 full time 6 graduate students enrolled

Applied Mechanics Soil and fluid mechanics Prerequisites completion of undergraduate curriculum in engineering substantially equivalent to one of those offered at Kansas State College, grade of B or better in junior and senior years Recommended mathematics through differential equations Faculty 12 full time, 6 part time. 4 graduate students enrolled

Bacteriology Soil, industrial, rumen, food and dairy, and pathogenic bacteriology, virology bacteriophage, bacterial physiology, immunology, and intestinal microflora Combined program with Departments of Dairy Husbandry, Animal Husbandry, and Milling Industry Prerequisites 13 hours of bacteriology, chemistry through organic chemistry, quantitative analysis, and one year of college physics Prefer that students have a good background of biological sciences, chemistry, physics and mathematics Recommended biochemistry, calculus and modern languages Faculty 9 full time, 3 part time 12 graduate students enrolled

Botany Students may major in ecology, taxonomy, cytology, plant pathology, plant physiology cytogenetics plant anatomy, or mycology Split or joint majors with other departments sometimes allowed Prerequisites general botany, plant physiology, plant taxonomy, plant pathology (a three hour course in ecology or anatomy may replace one of the 3 hour courses), college degree, a qualitative examination is required of those who come with a MS from another institution Faculty 14 full time 7 graduate students enrolled

Chemistry Biochemistry, inorganic, analytical, organic, and physical chemistry Chemistry Nutrition combined program Prerequisites bachelor's degree, entrance, qualifying, and preliminary examinations Faculty 32 full time 27 graduate students enrolled

Entomology Host plant resistance to insects, stored grain insects, insect toxicology and physiology, morphology and taxonomy, shade tree apiculture insects, agricultural entomology, medical entomology, livestock insects Prerequisites 8 hours of zoology and/or animal science, 8 hours of botany and/or plant science, 9 hours of entomology, 10 hours in chemistry and/or physics,

and one course in bacteriology Faculty 16 full time, 2 part time. 15 graduate students enrolled

Foods and Nutrition Food, nutrition, chemistry Prerequisites BS degree equivalent to one earned by a foods and nutrition major at Kansas State College, general and organic chemistry, bacteriology, zoology, physiology, household physics, Foods I, II, applied nutrition, dietetics Faculty 9 full time, 6 part time. 5 graduate students enrolled.

Genetics Biochemical, poultry, and dairy genetics, agronomy, and animal husbandry Six departments participate Prerequisites general and organic chemistry, botany, zoology, 6 hours of advanced biology, algebra, trigonometry, and elemental genetics Recommended emphasize physical sciences Faculty 8 part time, 10 graduate students enrolled.

Mechanical Engineering Machine design and thermal engineering (thermodynamics, heat transfer, gas and fluid dynamics, air conditioning, and power) Prerequisites MS degree in mechanical engineering or equivalent Faculty 20 full time, 3 part time. 3 graduate students enrolled

Milling Industry Cereal chemistry, milling technology, and feed technology Five departments offer combined program. Prerequisites general chemistry, physics differential and integral calculus or advanced statistics, and biology Recommended prefer students who have had experience in flour and feed milling industries Faculty 14 full time 5 graduate students enrolled.

Parasitology Agricultural parasitology host-parasite relationships, anthelmintics, radioactive isotopes and chemistry applied to parasites Prerequisites bachelor's or master's degree with specialization in zoology, courses should include entomology, reading knowledge of scientific German and French. Recommended courses in statistics biochemistry, and bacteriology, including immunology Faculty 2 full time, 1 part time. 8 graduate students enrolled

Physics Gaseous electronics, photoelectricity, X ray diffraction, Beta ray spectroscopy, molecular spectroscopy, electron microscopy, theoretical physics, and meteorology Prerequisites intermediate courses in mechanics, heat electricity, light, and atomic physics At least one credit hour of laboratory in each of three of the above fields. At least six semester hours of mathematics be

yond introductory calculus Tests given only after admission Faculty 16 full time 10 graduate students enrolled

Psychology General industrial and counseling psychology Prerequisites BS with minimum of 15 hours of psychology including statistics Faculty 8 full time 3 part time 3 graduate students enrolled.

NOTES

A program designed to improve the preparation of graduate students for college teaching was undertaken in 1955-6 with the scheduling of two new seminars on the principles and problems of college teaching The courses without prerequisites and each carrying two hours of graduate credit enable the prospective college teacher to supplement his preparation in his field of specialization

Figures on graduate students enrolled include only those working toward the Ph.D.

University of Kansas

LAWRENCE, KANSAS

The Graduate School

Established in 1896 the Graduate School conferred its first Ph.D. in that year As early as 1881 there had been a formal plan for graduate study Supervision over graduate work in all departments of the University including those at the Medical Center in Kansas City is exercised by the Graduate School

Special collections in European history modern English literature history of botany and ornithology Affiliation with Linda Hall Library in Kansas City geology field camp in Colorado natural history and art museums Bureau of Child Research special rehabilitation facilities cooperation with Kansas School for the Deaf in teacher training Affiliation with Argonne National Laboratory arrangements for doctoral training with the Los Alamos Scientific Laboratory cooperative practical training in psychology and music education at the Menninger Clinic in Topeka Government Research Center Bureau of Business Research facilities of the Kansas Geological Survey

Men and women 52 Ph.D.s awarded in 1956-7

Residence requirement for doctorate three years of study in residence

ADMISSION REQUIREMENTS

Completion of a baccalaureate program and specific preparation in the area of the proposed major field GRE Apply to the Graduate School six weeks before period of graduate study begins

A reading knowledge of French and German in all departments added language proficiency in the Departments of English, Romance Languages and certain areas in the Department of History

FEEES AND FIRST YEAR AID

Tuition—\$206 per academic year for in state, \$306 for out-of state Room—\$20 \$40 per month Board—\$50 \$75

Financial aid includes numerous University scholarships as well as departmental scholarships in 15 areas Apply before March 1 to Office of the Graduate School

FIELDS OF STUDY FOR THE PH.D.

Anatomy Prerequisites work in biology chemistry and physics needed for admission to a medical school course in gross anatomy Faculty 6 full time 11 graduate students enrolled

Bacteriology Prerequisites 26 semester hours of credit in biological science courses including the core work required of the undergraduate major in bacteriology Faculty 3 full time 27 graduate students enrolled

Biochemistry Prerequisites work in organic and inorganic chemistry qualitative analysis quantitative analysis and an introductory course in biological chemistry Faculty 4 full time 9 graduate students enrolled

Botany Prerequisites 25 semester hours of credit in biological science courses (15 hours of credit must be in botany) Faculty 3 full time 9 graduate students enrolled

Chemical Engineering Prerequisites completion of an undergraduate course in chemical engineering accredited by E.C.P.D. Faculty 3 full time 15 graduate students enrolled

Chemistry Prerequisites undergraduate courses in inorganic, organic, analytical, and physical chemistry, mathematics (at least through calculus) A program in pharmaceutical chemistry is offered in collaboration with the Department of Pharmaceutical Chemistry in the School of Phar

macy Faculty 15 full time. 83 graduate students enrolled.

Economics Prerequisites 20 hours of college esedit in economics and related courses in political science, history, and sociology Faculty 10 full time 14 graduate students enrolled.

Education Prerequisites course eseditis required for certification to serve in the schools of Kansas A program in counseling psychology is offered with the Department of Psychology Faculty 22 full time 156 graduate students enrolled.

Electrical Engineering Prerequisites completion of an undergraduate course in electrical engineering which is accredited by ECPD Faculty 7 full time 44 graduate students enrolled.

English Language and Literature Prerequisites at least 24 semester hours of college credit in English, Latin, French, or German. Faculty 18 full time 47 graduate students enrolled.

Entomology Prerequisites 30 semester hours of college credit in biological science, including a beginning course in entomology Faculty 7 full time 20 graduate students enrolled.

Geography Prerequisites an undergraduate training in the social sciences, basic beginning courses in geography Faculty 5 full time, 1 part time. 12 graduate students enrolled.

Geology Prerequisites an adequate undergraduate preparation in mathematics chemistry, physics and the principal areas of geological study Faculty 12 full time. 50 graduate students enrolled.

History Prerequisites at least 20 semester hours of credit in college courses in history, Russian, as well as German and French, for students needing the language. Faculty 14 full time. 24 graduate students enrolled.

Mathematics Prerequisites courses which approximate an undergraduate major in mathematics Faculty 18 full time. 35 graduate students enrolled.

Medical Microbiology Prerequisites credit in courses needed for admission to a medical school, including an introductory course in bacteriology or microbiology Faculty 6 full time. 7 graduate students enrolled.

Medical Pharmacology Prerequisites credit in mathematics through calculus, 25 semester hours of esedit in chemistry, 10 semester hours in college physics. Faculty 5 full time. 2 graduate students enrolled.

Music Education Prerequisites completion of

a basic program in music education, or its equivalent. Faculty 5 full time. 30 graduate students enrolled.

Physics Prerequisites at least 22 semester hours of esedit in college physics, a working knowledge of calculus Faculty 12 full time. 30 graduate students enrolled.

Physiology Prerequisites courses needed for admission to a medical school. Faculty 6 full time 4 graduate students enrolled.

Political Science Prerequisites 15 semester hours of esedit in political science and work in a related field of social science. Faculty 14 full time, 6 part time. 32 graduate students enrolled.

Psychology Prerequisites 15 semester hours of credit in psychology, including a course in experimental psychology in addition, an introductory course in statistics. Combined program in counseling psychology offered with the Department of Education. Faculty 12 full time, 4 part time. 76 graduate students enrolled.

Romance Languages French or Spanish may be effected as a major field. Prerequisites at least 26 semester hours of credit in French or Spanish, depending upon the major, in addition to German and French, a knowledge of a second Romance language is required of those majoring in French. Faculty 10 full time. 30 graduate students enrolled.

Sociology Prerequisites at least 25 semester hours of esedit in social science courses, with a minimum of 15 hours in sociology Faculty 10 full time. 12 graduate students enrolled.

Zoology Prerequisites the courses required of an undergraduate major in biology Faculty 12 full time. 34 graduate students enrolled.

University of Kentucky

LEXINGTON, KENTUCKY

Graduate School

Established 1912 Graduate degrees awarded since 1870 The Graduate School supervises graduate work in all colleges. Master's level conducted in 50 departments, doctoral work in 15 Administered by the Dean, an elective administrative committee of 10 (The Graduate Council), and a Graduate Faculty of 175

Eng D offered in metallurgical engineering
No enrollment restrictions Land grant and
state university

Summer and evening courses 20 Ph.D's a
warded in 1956-7

Residence requirements for doctorate mini
mum of 2 years above the master's

Transfer requirements complete transcript of
all prior college work.

ADMISSION REQUIREMENTS

Graduation from an accredited college with
at least a C plus average and an undergraduate
major in the subject to be pursued

Required tests GRE during first semester

Apply at least 30 days before entrance to
Registrar

FEES AND FIRST YEAR AID

Tuition—In state, \$65 per semester, out-of
state, \$125 per semester Room for men, \$70-
\$100 per semester, women, \$170 per semester
(includes 3 meals) Board for men, app \$100
per semester

Each department awards a few graduate as
sistantships Graduate School awards a few non
service scholarships and fellowships Apply be
fore March 1 to department for assistantships,
to Graduate School for scholarships

FIELDS OF STUDY FOR THE PH D

Agricultural Economics Faculty 16 full time
16 graduate students enrolled.

Animal Industry Faculty 23 full time 25
graduate students enrolled.

Bacteriology Faculty 9 full time 17 grad
uate students enrolled

Chemistry Faculty 29 full time 30 graduate
students enrolled.

Counseling and Guidance Faculty 5 full
time. 6 graduate students enrolled.

Economics Faculty 13 full time 7 graduate
students enrolled

Education Faculty 22 full time 258 gradu
ate students enrolled.

English Speech and Drama Faculty 37 full
time 32 graduate students enrolled

History Faculty 14 full time 22 graduate
students enrolled

Mathematics and Astronomy Faculty 30 full
time 15 graduate students enrolled.

Physics Faculty 14 full time. 20 graduate
students enrolled.

Political Science Faculty 8 full time 20 grad
uate students enrolled

Psychology Faculty 20 full time. 59 gradu
ate students enrolled

Sociology Faculty 8 full time 17 graduate
students enrolled

Metallurgical Engineering Faculty 5 full
time 7 graduate students enrolled.

Lehigh University

BETHLEHEM, PENNSYLVANIA

The Graduate School

Graduate study was announced as a part of the
original plan of the college in its first catalog in
1866 Formal organization was effected in 1883
Doctoral work was offered in 1936 with the or
ganization of a Graduate Faculty which governs
the school

World's largest universal testing machine in
the engineering laboratory, extensive Amsler
equipment for studies of cyclic loading, fatigue
laboratory in psychology, exceptional laboratory
facilities in chemistry

Men and women. Limited number of summer
and evening courses 14 Ph.D's awarded in
1956-7

Residence requirement for doctorate mini
mum of two full years of resident study, at least
one full year must be at the University

ADMISSION REQUIREMENTS

Bachelor's degree or a degree in technology
from a recognized college, university, or tech
nical institution. Two or preferably three, let
ters of recommendation.

Reading knowledge of two appropriate lan
guages is required for doctorate, though not for
admission

Placement tests given by some departments
after admission.

GRE recommended, also similar tests spon
sored by appropriate professional societies

Apply to Director of Admission, Lehigh Uni
versity prior to March 1

FEES AND FIRST YEAR AID

Tuition—\$300 per semester, or \$25 per se
mester hour Rooms are not normally provided

by the University, but dining facilities and a few rooms are available

Teaching and research assistantships ranging from \$1,500 to \$2,000 for the academic year, plus ten hours of free tuition each semester, are available in most departments. Other fellowships in various amounts and with varying duties

Apply before March 1 to Director of Admission. Late applications are considered however, for any vacancies

FIELDS OF STUDY FOR THE PH D

Biology Biology, microbiology. Prerequisites: baccalaureate degree, with a major in biology, in microbiology, adequate preparation in analytical and organic chemistry also required, normally French and German. Recommended: GRE Faculty 7 full time 12 graduate students enrolled

Chemical Engineering Thermodynamics, unit operations, reaction kinetics. Cooperative research work is done with Departments of Chemistry and Mechanical Engineering. Prerequisites: baccalaureate degree with a major in chemical engineering, normally French and German. Faculty 5 full time 12 graduate students enrolled

Chemistry Analytical, organic, and physical chemistry, surface chemistry, leather technology, printing ink research. Prerequisites: year courses in general, analytical, organic, and physical chemistry, plus a thorough grounding in physics and mathematics through calculus, normally French and German, placement examinations in analytical, organic, and physical chemistry for new students. Recommended: GRE Faculty 12 full time, 2 part time 46 graduate students enrolled

Civil Engineering Emphasis on structural engineering, with extensive collateral work available in hydraulics, sanitary engineering, soil mechanics, engineering mechanics, and related fields. Prerequisites: baccalaureate degree in civil engineering, with appropriate work in mathematics and mechanics, normally French and German. Faculty 13 full time 45 graduate students enrolled

Electrical Engineering Power and communications. Prerequisites: baccalaureate degree in electrical engineering, with appropriate background in physics and mathematics, normally French and German. Faculty 7 full time 12 graduate students enrolled

English English and American literature, Chaucer. Prerequisites: baccalaureate degree, with equivalent of a major in the field, two, or preferably three, foreign languages appropriate to the candidate's work. Faculty 11 full time 21 graduate students enrolled

Geology Structural geology, stratigraphy, petrography, and economic geology. Collateral work in other fields available. Prerequisites: baccalaureate degree, with the equivalent of a major in the field, normally French and German. Faculty 5 full time 14 graduate students enrolled

History and Government American, American Colonial, and English history. Prerequisites: baccalaureate degree in history or an allied field with at least 12 semester hours of history, normally French and German. Faculty 8 full time 21 graduate students enrolled

Mathematics Analysis, algebra, geometry. Prerequisites: baccalaureate degree with the equivalent of a major in mathematics, including not less than 12 semester hours of work requiring a year of calculus as a prerequisite, normally French and German. Faculty 16 full time 12 graduate students enrolled

Mechanical Engineering Design, heat transfer, thermal stresses. Prerequisite: baccalaureate degree, with a major in mechanical engineering, normally French and German. Recommended: GRE Faculty 5 full time, 1 part time 37 graduate students enrolled

Metallurgical Engineering Physical and mechanical metallurgy, welding, magnetism, powder metallurgy. Prerequisites: baccalaureate degree with a major in metallurgy, French and German (may be taken in Graduate School). Recommended: GRE Faculty 7 full time 16 graduate students enrolled

Physics Theoretical physics, transient fluid dynamics, elastic and plastic deformation of metals, thermal conductivity. Prerequisites: baccalaureate degree, with a major in physics, French and German (may be taken in Graduate School). Recommended: GRE Faculty 11 full time 40 graduate students enrolled

Psychology Physiological psychology, especially bioelectric studies, sensory and perceptual psychology. Prerequisites: baccalaureate degree, with a major in psychology, normally French and German. Students transferring to psychology from related fields can frequently make up un

dergraduate deficiencies while in graduate school. Faculty 7 full time. 18 graduate students enrolled.

NOTES

In most departments the duties of a teaching assistant are planned to develop him as a competent teacher, and his responsibilities are normally increased as he gains experience so as to broaden and strengthen his training

Louisiana State University

BATON ROUGE 3, LOUISIANA

The Graduate School

First master's degree granted in 1869. 471 granted prior to 1931 when the Graduate School was organized under a Dean and Council. All graduate work, including programs for the Ph.D. in basic medical sciences, is administered by the Graduate School, except professional curricula in medicine, law and social welfare.

Allied School of Medicine in New Orleans offers M.D.

Summer and evening courses available 47 Ph.D.s awarded in 1936

Residence requirements for the doctorate one year in residence beyond the master's degree three years of graduate study

ADMISSION REQUIREMENTS

Overall scholastic average of 1.5 (B minus) in undergraduate work and 2.0 (B) in graduate work. Student must be accepted by academic department for a specific field of study

Ph.D. programs require French and German in all departments.

Ordinarily Departments of Chemistry, Psychology, and Zoology require qualifying tests

Apply to Dean of the Graduate School two weeks prior to start of semester or summer term.

FEES AND FIRST YEAR AID

Tuition—\$30 per semester Rooms for men, \$72-\$120 per semester, for women \$120-\$130 Board—average of \$1.50 per day in cafeterias

Apply to department concerned, six or more

months prior to registration, for graduate assistantships and other financial aid programs

FIELDS OF STUDY FOR THE PH.D.

Accounting Combined program offered leading to a Ph.D. in business administration with an accounting major Requirements for the Ph.D. 60 hours above bachelor's degree, 30 of which must be strictly graduate courses, of the 60-24 hours above the requirement for the M.B.A. must be in the major and first minor field, six in the second minor field, French and German (possible substitution of Spanish for French), satisfaction of all specific requirements for the M.B.A. Recommended practical teaching and/or business experience Four minor fields must be covered in the course Faculty 9 full time, 2 part time, 40 graduate students enrolled.

Agricultural Chemistry and Biochemistry Plant biochemistry, animal biochemistry, nutrition. Prerequisites mathematics through calculus 42 semester hours of chemistry, 20 semester hours of biological sciences 24 of humanities and social sciences, reading knowledge of scientific German and French Faculty 6 part time 9 graduate students enrolled

Agricultural Economics Farm management, marketing, land economics, agricultural finance, prices and statistics, agricultural policy Minors must be taken in two other disciplines Prerequisites 6 semester hours of economic principles, 3 hours of accounting, 3 hours of elementary statistics, 6 hours of applied courses, standing in upper 25 percent of class Recommended farm experience Faculty 18 full time, 9 12 part time. 20 graduate students enrolled

Agronomy Crops and soils science. Combined program with horticulture. Prerequisites undergraduate curriculum in agronomy completed with GPA of 1.5 Recommended one full year of experience in agronomy under practical conditions or with a research agency Faculty 1 full time, 6 part time. 26 graduate students enrolled.

Anatomy (given at Medical School) Human anatomy, histology and embryology, neuroanatomy, electron microscopy of tissues and cytology, comparative anatomy, and embryology of vegetables Prerequisites college major in biology, interview Recommended laboratory experience in histology, chemistry, and physics Faculty 7 full time, 5 part time.

Biochemistry (given at Medical School)

Comparative biochemistry, metabolism and renal biochemistry, hepatic biochemistry, nutrition of micro organisms organic chemistry of the carbohydrates Prerequisites bachelors degree, in interview, background must be equal to the BS in chemistry and must include courses in biology Faculty 5 full time, 1 part time 5 graduate students enrolled

Botany Bacteriology and Plant Pathology Combined program with horticulture Prerequisites botany and plant pathology—beginning course, introductory plant pathology, bacteriology—24 semester hours Recommended 18 hours of chemistry Faculty 9 full time, 4 part time, 9 persons from the staff of the experimentation station to direct research for dissertation 32 graduate students enrolled

Business Administration Management, finance, and marketing Combined program with economics and accounting Prerequisites masters degree or equivalent Faculty 11 full time, 6 part time 9 graduate students enrolled

Chemical Engineering Heat transfer, distillation, evaporation thermodynamics, reactor design, mass transfer, materials handling and instrumentation Prerequisites BS Faculty 5 full time, 1 part time 65 graduate students enrolled

Chemistry Physical, organic, analytical, and inorganic chemistry, subordinate areas Minors permitted in mathematics, physics, biochemistry, and engineering Prerequisites accredited undergraduate degree, with concentration preferably in chemistry, physics and mathematics, written orientation tests Recommended German, advanced undergraduate courses in all major areas of chemistry Faculty 15 full time, 2 part time 47 graduate students enrolled

Dairy Nutrition, breeding physiology, and production Prerequisites BS, entrance test It is desirable for a student to have background in course work equivalent to that of students who completed the dairy curriculum in this department Faculty 10 full time 6 graduate students enrolled

Economics Economic theory, public finance foreign trade, economic history Combined programs with business administration, agricultural economics, history, and forestry Prerequisites economic principles, intermediate theory, economic development of the United States, plus 24 hours of elective courses Faculty 7 full time, 1 part time 7 graduate students enrolled

Education A general course designed to prepare Ph.D. candidates for teacher training positions Prerequisites completion of a standard undergraduate program which provides a life time teaching certificate, completion of the M.A. program, successful teaching experience Faculty 17 full time 36 graduate students enrolled

English English and American literature, language A student is expected to have an M.A. in English before starting work for the doctorate Faculty 40 full time, 4 part time 33 graduate students enrolled

Foreign Languages Romance linguistics and philology, French and Spanish, Germanic studies (minor only) There is an interdepartmental program in linguistics Prerequisites equivalent of 24 semester hours of undergraduate study in major field, reading knowledge of French, Spanish, German, equivalent of two semesters study of Latin, fluent oral aural proficiency in language of major field Recommended Greek and Latin literature, minimum of six months of study travel in country of major language Faculty 21 full time, 1 part time 19 graduate students enrolled

Geography and Anthropology Cultural geography, geomorphology There is an informal arrangement between departments offering geography and anthropology and geography and geology Prerequisites quality of student is deemed more important than specific courses, French and German necessary in every case, tests in English and other subjects are required if deemed necessary for the individual student Recommended travel, wide reading Faculty 5 full time 3 part time 18 graduate students enrolled

Geology Stratigraphy, paleontology, geomorphology petrology, areal and subsurface geology Prerequisites see catalog for 12 geology courses, English proficiency test Faculty 9 full time, 4 part time 70 graduate students enrolled

Health Education and Physical Education Minor required in a related field, such as education, psychology, sociology, and zoology Prerequisites minimum of 20 semester hours in basic health and/or physical education courses Recommended approved teaching certificate, plus minimum of two years of teaching experience Faculty 15 full time, 4 part time 28 graduate students enrolled.

History Southern, Louisiana, and Latin American history Combined program with social sciences, speech, and English. Prerequisites degree

with a major in history (each case is examined separately) Recommended American historiography, course in introduction to historical research Faculty 10 full time 28 graduate students enrolled

Horticulture Floriculture, landscape design, ornamental horticulture, pomology, vegetable crops, in combined programs which include horticulture agronomy or horticulture botany Prerequisites a graduate in horticulture from a land grant college, or its equivalent Recommended certain courses in botany plant pathology, plant physiology, and genetics to make a well rounded program Faculty 2 full time, 3 part time 21 graduate students enrolled

Linguistics Historical, comparative, and descriptive linguistics This is an interdepartmental program administered by a committee from three departments, all students register in a regular department for administration of records, scholarships etc., academic program is supervised by the committee Prerequisites master's degree, or its equivalent, in English, speech, or a foreign language Recommended Latin or Greek. A Ph.D in Romance philology is also awarded Faculty 13 part time 2 graduate students enrolled

Mathematics Algebra, topology, number theory topological algebra Prerequisites calculus, plus some extra work, certain tests Recommended courses in theory of equations, advanced calculus, and others Faculty 29 full time, 5 part time 12 graduate students enrolled

Microbiology (given at Medical School) Virology, parasitology Prerequisites depend upon individual qualifications German and French required Recommended MS in general bacteriology Faculty 4 full time 2 graduate students enrolled

Pharmacology (given at Medical School)

Physics Low temperature, nuclear particle impacts using Van de Graaff and Cockroft Walton, beta and gamma ray spectroscopy, nuclear theory, solid state theory physical electronics Prerequisites 30 hours of undergraduate physics, including general physics, mechanics, electricity and magnetism with laboratory, and modern physics, general chemistry and one year of calculus Recommended advanced calculus Faculty 11 full time 36 graduate students enrolled

Physiology (given at Medical School) Physiology of the cardiovascular system and neuro

physiology Prerequisites premedical chemistry, biology, and physics, GRE, basic medical course in physiology, special graduate courses in physiology, medical pharmacology, and biochemistry Recommended comparative or mammalian anatomy and histology, periods of serving as assistant to faculty members, using various techniques, in 3 departments, physiology, pharmacology, and biochemistry 1 graduate student enrolled

Poultry Industry Nutrition, breeding production in combined program of nutrition with biochemistry and breeding with zoology Prerequisites 18 hours of poultry industry courses or those closely allied to the subject Recommended organic chemistry, quantitative analysis, physics, physiology Faculty 5 full time 7 graduate students enrolled.

Psychology Clinical psychology, personnel industrial psychology, general experimental psychology Prerequisites 18 hours of psychology which must include one course in beginning statistics and one or more courses in experimental psychology, MAT Faculty 10 full time, 4 part time 46 graduate students enrolled

Sociology Theoretical, occupational and industrial, and rural sociology, demography, interpersonal relations, social organization, social change, movements and trends Doctoral students usually minor in anthropology, psychology, or related field Prerequisites bachelor's degree from accredited college Students with broad training in social sciences and humanities are preferred Faculty 12 full time 24 graduate students enrolled

Speech Drama, speech correction, linguistic geography, audiology, public address, voice science speech education, interpretation Three departments participate in interdepartmental linguistics program. Faculty 13 full time, 3 part time 40 graduate students enrolled

Vocational Agricultural Education Prerequisites at least 12 semester hours in basic vocational agricultural education Recommended at least one year in successful teaching. Faculty 4 full time 50 graduate students enrolled

Zoology General zoology, embryology, parasitology entomology genetics, vertebrate and invertebrate zoology, and physiology Combined programs with psychology, botany and conservation Prerequisites general zoology, comparative anatomy and additional courses to make 30 semester hours in zoology, GRE, either before or

trance or during first semester Faculty 13 full time, 2 part time 26 graduate students enrolled

University of Louisville

LOUISVILLE, KENTUCKY

Graduate School

The Graduate School has offered master's degrees since 1908 and the Ph.D. since 1952. 6 Ph.D.s awarded in 1956-7.

Residence requirement for the doctorate: one full year of full-time residence is required; in general, three years must intervene between the baccalaureate degree and the Ph.D.

ADMISSION REQUIREMENTS

Students, in general, must have maintained a B average in undergraduate work and must satisfy the head of their major department as to their background.

A knowledge of two foreign languages is required of all Ph.D. candidates.

Apply to the Graduate School.

FEES AND FIRST YEAR AID

Tuition—\$17 per semester hour up to a maximum of \$204.

A few graduate assistantships are available for first-year students. Apply to the head of the student's major department.

FIELDS OF STUDY FOR THE PH.D.

Chemical Engineering Mass and heat transfer, plastics and protective coatings. Faculty 5 full time, 3 part time. 19 graduate students enrolled.

Chemistry Organic, analytical, physical, bio-physical. Combined program with Physiology Department. Prerequisites: 30 hours in chemistry, including physical chemistry, calculus, advanced (senior) laboratory course, reading knowledge of German and French or Russian. Faculty 10 full time, 4 part time. 35 graduate students enrolled.

Medical Sciences Anatomy, biochemistry, microbiology, pharmacology, physiology. 17 graduate students enrolled. Administered by Committee on Medical Sciences.

Loyola University

CHICAGO, ILLINOIS

Graduate School

The Graduate School was constituted a distinct unit in 1926. It has jurisdiction over curricula leading to all advanced degrees. The Graduate Division of West Baden College, West Baden Springs, Indiana, is academically affiliated and offers the S.T.D.

Resident facilities for both men and women graduate students are available. The main library and laboratories are located on the Lake Shore Campus, and other facilities are maintained at Lewis Towers.

Facilities for clinical training and research include the Lake County Mental Hygiene Clinic, The Catholic Charities Guidance Bureau, Cook County Psychopathic Hospital, Chicago State and Loretto Hospitals, and the Loyola Center for Guidance and Psychological Services.

Men and women. Summer and evening courses. 18 Ph.D.s awarded in 1956-7.

Residence requirement for the doctorate: two years of full-time study after the master's degree.

Under exceptional circumstances, six semester hours may be transferred for the master's degree; one third of the total course requirement may be transferred for the doctor's degree.

ADMISSION REQUIREMENTS

An applicant must hold a bachelor's degree from an institution of approved standing. French and German are required for the Ph.D., with most departments requiring one foreign language for the master's degree. Oral or written examinations or both, at the discretion of the department concerned, are required for all advanced degrees. Nearly every department has certain compulsory courses and most require a special course in methodology.

Apply to the Graduate School, Loyola University, 820 North Michigan Ave., Chicago 11, Illinois at least four weeks in advance of the semester.

FEES AND FIRST YEAR AID

Tuition—approximately \$600 per year. Room for men or women—\$400 per year. Board—\$500.

Graduate assistants are paid from \$1,000 to \$2,400 per academic year, depending upon the services required. Apply by April 1 to the Graduate School

FIELDS OF STUDY FOR THE PH D

Anatomy Advanced embryology, endocrinology, anatomy and physiology of central nervous system, specific problems in microscopic anatomy Arrangements are made with the School of Dentistry so that graduate students may do advanced work in oral anatomy Prerequisites a major in zoology, or a major in chemistry with a minor in zoology, French and German Faculty 9 full time, 8 part time 14 graduate students enrolled

Biochemistry Chemistry of hormones, special problems in biochemistry, enzyme and bio-organic chemistry Prerequisites an undergraduate major in chemistry, or its equivalent. Faculty 6 full time, 7 part time 12 graduate students enrolled

Chemistry Special topics in physical and nuclear chemistry, organic analytic reagents, research in analytical chemistry Prerequisites an undergraduate major in chemistry Faculty 9 full time 2 part time. 27 graduate students enrolled

Education Psychology of learning, philosophy of education, tests and measurements, school administration, school supervision. Prerequisites an undergraduate major in education Faculty 12 full time, 8 part time 51 graduate students enrolled.

English Gerard Manley Hopkins and modern poetry, Anglo-Irish poetry, advanced Newman, studies in English romanticism. Prerequisites an undergraduate major in English, French and German. Faculty 18 full time, 10 part time 46 graduate students enrolled

History Hispanic American history, the American Revolution, intellectual history of Europe, intellectual history of the Middle Ages, institutional history of the Middle Ages Prerequisites an undergraduate major in history Faculty 14 full time, 6 part time 42 graduate students enrolled

Microbiology Advanced virology, physiology of microorganisms, advanced cytology, advanced parasitology Prerequisites a major in chemistry, botany, zoology, or bacteriology Faculty 4 full time, 3 part time 8 graduate students enrolled

Pharmacology Enzyme pharmacology, myology, industrial applications to pharmacology, chemotherapy Prerequisites a bachelor's degree in pharmacy or in science with a major and minor in chemistry and biology, or a degree in dentistry or in medicine Faculty 4 full time, 3 part time 8 graduate students enrolled

Physiology Energy metabolism, physiology of the vasomotor and sudomotor systems, experimental physiology, special problems in physiology Prerequisites an undergraduate major in one of the basic sciences Faculty 4 full time, 4 part time 10 graduate students enrolled.

Psychology Personality tests, psychology of religion, psychotherapy, factorial analysis Prerequisites an undergraduate major in psychology Faculty 14 full time, 10 part time 50 graduate students enrolled

University of Maryland

COLLEGE PARK, MARYLAND

Graduate School

Founded as a graduate school in 1918, although graduate degrees had been given before that time First Ph D awarded in 1920 M.D and DDS offered by allied divisions Ed D offered under jurisdiction of the Graduate School. Graduate faculty nearly 400

Campus housing is limited, but abundant housing facilities are available in Washington, DC metropolitan area

Outstanding library facilities in area, governmental laboratories and bureaus of Washington, wind tunnel, molecular physics laboratory, institutes of (1) applied mathematics, (2) fluid dynamics, and (3) human development and child study

Men and women. Summer courses, evening courses in a few areas 76 Ph D's awarded in 1956-7

Residence requirement for doctorate three academic years full time, or its equivalent.

Transfer students must take one full year of residence, meet language requirements, and take comprehensive tests

ADMISSION REQUIREMENTS

Undergraduate degree, with 'B' (3.0) average

in area of major interest and related subjects. Some departments add tests, languages, and other devices for additional admission requirements.

French and German generally, but substitutes allowed in some areas.

Recommended GRE and/or MAT

Apply to Graduate School Office before June 10 for Summer term, September 1 for Fall term, and January 1 for Spring term.

FEES AND FIRST YEAR AID

Tuition—\$100 per semester, \$60 per summer. Room—\$350 \$500. Board—\$800 \$1,000.

Fellowships (\$800), graduate and research assistantships (\$163.50 per month) both on 10 and 12 month appointment, fees remitted or stipend adjusted. Apply to Graduate School or departmental office by March 1.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Farm management, marketing, taxation and farm finance, land economics, agricultural policy, foreign agricultural trade. Combined program with economics. Prerequisites: agricultural economics, general economics, statistics, preliminary examinations in five areas of study. 33 graduate students enrolled.

Agronomy Crop production, crop breeding, soils, soil conservation. Combined programs with botany. Primarily, student must have a good background in agronomy and preferably a good background in basic botany, chemistry, etc. Faculty 18 full time, 25 graduate students enrolled.

American Civilization Combined programs with cooperating departments: English, History, Government and Politics, Sociology. Prerequisites: normally an undergraduate major in one of the four cooperating departments. Recommended in addition to the major: strong work in one of these areas—English, history, government and politics, sociology. Program is administered by Committee on American Civilization. Faculty is drawn from four cooperating departments named above. 7 graduate students enrolled.

American History Colonial, middle period, Civil War, Reconstruction, and New Nation. Prerequisites: extensive course work, with a good record in the humanities and/or social sciences. Faculty 6 full time, 5 graduate students enrolled.

Anatomy Two separate fields of study offered.

By School of Dentistry: gross and neuroanatomy, combined programs with microbiology, physiology, biochemistry, prerequisites—zoology major, French and German, preliminary tests. Faculty 2 full time, 1 part time. 1 graduate student enrolled. By School of Medicine: anatomy, neuroanatomy, combined programs with biochemistry, pharmacology, prerequisites—A.B. or B.S., GRE, science background (including physics, chemistry, and biology), French and German, personal interview. Faculty 8 full time, 2 part time. 3 graduate students enrolled.

Biological Chemistry Areas of concentration include programs in the Medical School, in the Department of Pediatrics, and with the Army Chemical Center. Combined Ph.D. programs with Biochemistry Department of the College of Dentistry. Prerequisites: general, organic, and physical chemistry, quantitative analysis, calculus, French and German, high collegiate grades. Faculty 6 full time, 1 part time. 9 graduate students enrolled.

Botany Cytology, anatomy, plant physiology, plant pathology. Prerequisites: 22 semester hours in botanical sciences plus organic chemistry, college mathematics, college physics, reading knowledge of French and German. Recommended: mathematics through calculus, GRE. Faculty 16 full time, 31 graduate students enrolled.

Chemical Engineering Chemical engineering, fuels, unit operations, combustion, explosives, metallurgy, physical metallurgy, corrosion. Nuclear engineering, radiation, polymerization, radio fuel processing. Students may minor in other engineering programs, chemistry, physics, or mathematics. Prerequisites: B.S. in engineering or a physical science, provisional admission if deficient in undergraduate chemistry, mathematics, and elements of chemical engineering subject to removal of deficiencies, French and German tests. Faculty 6 full time, 1 part time. 37 graduate students enrolled.

Chemistry Analytical, inorganic, organic, and physical chemistry, biochemistry. Prerequisites: A.B. or B.S., with a 'B' average in any courses in chemistry, mathematics, and physics, courses must have included inorganic, quantitative, physical, and organic chemistry, reading examination (dictionary) in French and German (or Russian). Faculty 17 full time, 102 graduate students enrolled.

Dairy Dairy production, nutrition, physiology.

ogy, breeding, management, dairy technology, chemistry, product development, bacteriology Prerequisites undergraduate degree in animal sciences, dairy technology, or biochemistry Recommended working experience with animals or dairy industry Program administered by Poultry Dept Faculty 8 full time, 1 part time 21 graduate students enrolled

Economics Economic theory, history of economic thought, development, money and banking, international economics, public finance, labor, public utilities and social control of business, systems, planning institutional economics Combined programs with Business Administration and Organization Department. Prerequisites principles of economics intermediate economic analysis, money and banking, undergraduate minor in economics, 'B' average Recommended business cycles economic history, public finance, labor economics Faculty 12 full time, 2 part time 20 graduate students enrolled

Education Curriculum and instruction educational administration and supervision, elementary education, guidance, history, philosophy, comparative education, human development, industrial arts, secondary education vocational and industrial education Prerequisites B.S., including at least 16 semester hours of education and at least 12 semester hours of graduate work in education at this University, general background tests and preliminary examinations, at least B average in graduate work already completed, recommendations and approval of faculty sponsor and committee on doctoral program, outstanding promise Ed.D. is also offered A Ph.D., with a major in Physical Education, Recreation and Health is offered through Department of Physical Education Faculty 37 full time, 6 part time 770 graduate students enrolled (many part time)

Electrical Engineering Communications electronics Combined programs with physics, mathematics Prerequisites B.S. from accredited institution German and/or French and Russian, qualifying examination over electrical engineering and minor courses physics majors must take certain undergraduate E.E. courses in which they are usually deficient Faculty 5 full time, 5 part time 25 graduate students enrolled for Ph.D.

English English literature before 1660, English literature after 1660 American literature, English language. Ph.D. in American Civiliza-

tion may be taken, with emphasis in area of American literature Prerequisites at least 30 credits of undergraduate English, French and German undergraduate courses Faculty 8 full time, 1 part time 26 graduate students enrolled.

Entomology Agricultural entomology, medical entomology, insect taxonomy, insect biology, insect morphology Prerequisites 12 semester hours in entomology Recommended courses in zoology, botany, chemistry Faculty 11 full time, 3 part time 23 graduate students enrolled

European History Early European, modern Europe, England and British Empire, Middle East, World War I, World War II Prerequisites extensive course work, with a good record in the humanities and/or social sciences Faculty 6 full time 7 graduate students enrolled

Foreign Languages French, German, Spanish literature Prerequisites a strong undergraduate major, with at least a B average in the major field, French and German 6 graduate students enrolled

Forensic Pathology Toxicology Prerequisites 8 semester hours each in general chemistry, organic chemistry, analytical chemistry (qualitative and quantitative), physical chemistry, physics, biology, 4 semester hours in organic qualitative analysis, B.S. or A.B. Faculty 4 part time 2 graduate students enrolled

Geography Admission based upon entire university record of candidate, quality of M.A. dissertation, and letters of recommendation Faculty 9 full time, 4 part time 20 graduate students enrolled.

Government and Politics American government, state and local government, political theory comparative government, international relations, public administration, public policy, and public law Prerequisites minimum of 18 credits of political science, with minimum grades of B-, at least one course in five or more of the fields listed above (in addition to American government), five written comprehensive examinations in five fields Faculty 10 full time, 3 part time 31 graduate students enrolled

Horticulture Pomology, olericulture, floriculture and ornamental horticulture, horticultural processing. Prerequisites overall 'B' average. B average in fundamental sciences Faculty 20 full time 18 graduate students enrolled

Mechanical Engineering Prerequisites B.S. in M.E., with undergraduate average of B and

accredited by Engineering Council for Professional Development Faculty 16 full time 66 graduate students enrolled

Microbiology Prerequisites chemistry, physics mathematics, biology Recommended 12 hours of bacteriology Minors in chemistry, botany, and zoology with other departments Faculty 5 full time 31 graduate students enrolled Also offered by Schools of Dentistry and Pharmacy dental and pharmacy microbiology, combined programs with biochemistry, anatomy, histology, physiology, operative dentistry, oral surgery, periodontia, pharmacy and pharmaceutical chemistry, prerequisites—BS and MS majors in microbiology, minors in allied fields French and German, preliminary examinations 4 graduate students enrolled

Pharmacology Drugs in hypertension, anesthesia mental illness Combined programs with Medical School (MD PhD) Prerequisites bachelor's degree in biology or chemistry Recommended experience with drugs (medicine or pharmacy) Program administered by School of Medicine Dept of Pharmacology Faculty 1 full time, 4 part time 5 graduate students enrolled

Pharmacy Pharmacy, pharmaceutical chemistry, pharmacology Prerequisites BS in pharmacy, with B average, French and German Faculty 16 full time, 1 part time 17 graduate students enrolled

Physical Education Combined programs in sociology, human development, education psychology, recreation health education Prerequisites zoology, anatomy, physiology, methods measurements, administration sport skills practice teaching, human development, German and French Recommended general background test, MAT teaching experience in public schools, courses in biological science Ed D also offered in this field Program administered by Departments of Physical Education and Education Faculty 3 full time, 4 part time

Physics Solid state, molecular physics microwave and radio frequency theoretical nuclear physics, cosmic rays, field theory, gaseous electronics, astrophysics, upper atmosphere and cosmic ray Combined programs in fluid dynamics molecular physics, mathematics Prerequisites general physics, heat, intermediate mechanics optics electricity and magnetism, modern physics, differential and integral calculus, good

mastery of English, average grade of B or better Recommended French and German, some experience in laboratories, e.g., from summer jobs Applied Mathematics degree also offered in this field Faculty 33 full time, 4 part time Graduate students enrolled 209 fall, 181 spring

Physiology Three separate fields of study offered

By Army Chemical Center Neuromuscular junction physiology, central neuronal physiology, functional importance of epinephrine and norepinephrine, culture and functional studies of isolated cells Prerequisites satisfactory record of college courses, including work in biology, physics, chemistry, and mathematics French and German Recommended summer course in physiology at Marine Biological Laboratory, Woods Hole, Mass Faculty 7 part time 6 graduate students enrolled

By Department of Physiology Central nervous system Prerequisites satisfactory record of college courses, including work in biology, physics, chemistry, and mathematics, French and German Recommended summer course in physiology at Marine Biological Laboratory, Woods Hole, Mass Faculty 7 full time, 1 part time 1 graduate student enrolled

By Department of Physiology, School of Dentistry Advanced mammalian physiology, muscle physiology, oral physiology, human physiology Required courses human gross anatomy and neuroanatomy, biochemistry, general physiology, physics (elementary), inorganic and organic chemistry Tests preliminary oral and written B.A. or BS in biological sciences required Recommended general physiology, cellular physiology, biostatistics Faculty 1 full time, 2 part time

Poultry Husbandry Nutrition, physiology or genetics Prerequisites basic courses in chemistry, physiology, genetics, oral and written preliminary examinations Recommended mathematics, physics, biochemistry practical experience in poultry husbandry Faculty 6 full time, 1 part time 11 graduate students enrolled

Psychology Industrial, social, counseling, experimental and quantitative psychology Prerequisites experimental psychology, statistics, tests and measurements, MAT and GRE, letters of recommendation. Recommended mathematics physics, physiology Faculty 11 full time, 6 part time 38 graduate students enrolled

Sociology The community, criminology, cultural anthropology, the family, industrial sociology rural sociology, population, urban sociology, social psychology, social theory, social welfare Prerequisites courses in theory and statistics, a general background of courses in sociology, B or better scholastic average, scholastic maturity Recommended equivalent of master's degree in this field Faculty 10 full time 40 graduate students enrolled

Zoology Cytology ecology embryology, fisheries, parasitology physiology systematic zoology Prerequisites undergraduate concentration in biology and physical sciences, B average in undergraduate record Recommended courses in comparative anatomy, embryology, genetics, ecology, physiology, histology physics organic chemistry, French and German Faculty 14 full time 5 part time 45 graduate students enrolled

Massachusetts College of Pharmacy

BOSTON, MASSACHUSETTS

The Graduate Division of the College

It is the purpose of the Graduate Division of the Massachusetts College of Pharmacy to prepare specialists as teachers and research workers in pharmaceutical science

The Sheppard Library and the Samuel M. Best Research Laboratory

1 Ph.D. awarded in 1956-7

Two years residence requirement for doctorate

ADMISSION REQUIREMENTS

B.S. in Pharmacy, including German.

Apply between January and July to the Graduate Council.

FEEES AND FIRST YEAR AID

Tuition—\$15 per credit hour

Some fellowships available which require about 20 hours per week devoted to departmental duties. Apply between January and April to the Dean.

FIELDS OF STUDY FOR THE PH.D.

Pharmacy Pharmaceutical chemistry and pharmacognosy Prerequisites German and scientific German Faculty 24 full time, 10 part time 24 graduate students enrolled

Massachusetts Institute of Technology

CAMBRIDGE, MASSACHUSETTS

Master of Science degree first conferred in 1886, Ph.D. in 1907, Sc.D. in 1911

Sc.D. offered by Departments of Aeronautical Engineering, Civil and Sanitary Engineering, Mechanical Engineering, and Metallurgy

Laboratories as follows: servomechanisms, gas turbine and automotive, dynamic analysis and control, supersonic, metals processing, hydrodynamics, digital computer, high voltage research, insulation research, research in executive behavior, and aero instrumentation, also under water ship propeller tunnel, ship model towing tank, IBM computation center

Summer courses 105 Ph.D.s awarded in 1956-7

Residence requirement for doctorate minimum of two academic years

ADMISSION REQUIREMENTS

Mathematics 2 years, physics, 2 years, chemistry, 1 year, at least six semester courses in cultural subjects

Apply to Admissions Office by March 1 preceding year of admission

FIRST YEAR AID

Apply to Admissions Office by March 1 preceding year of admission

FIELDS OF STUDY FOR THE PH.D.

Biology Biochemistry, biophysics, and analytical physiology Prerequisites 1 year of physics, mathematics through differential equations, chemistry through organic and physical Recommended general course leading to B.S. Faculty 15 full time Approx. 35 graduate students enrolled

Chemical Engineering Chemical engineering and nuclear engineering engineering operations applied chemistry fuel engineering Combined programs with food technology and process control Prerequisites SB or AB in chemistry chemical mechanical and electrical engineering physics Recommended advanced calculus, economics, physics, chemistry, organic chemistry Faculty 28 full time 229 graduate students enrolled

Chemistry Analytical, inorganic nuclear or organic, physical Prerequisites general Institute prerequisites, plus 8 additional semesters of chemistry Faculty 32 full time 210 graduate students enrolled

Economics and Social Science Industrial economics, industrial relations, economics and statistics Combined programs with economics and operations research, and economics and industrial management Prerequisites calculus, physics or another science, a baccalaureate degree, 2 languages, generally including German Faculty 42 full time, 20 part time 83 graduate students enrolled

Electrical Engineering Information theory, statistical theory of communication, network theory, feedback control, microwave electronics switching circuits, computers and automatic computation energy conversion systems and control, molecular engineering Program combined with physics or mathematics Prerequisites physics, mathematics, electrical engineering and humanities, high academic record, experience in research (SM thesis serves here) Sc.D also awarded in this field Faculty 53 full time, 1 part time 280 regular graduate students enrolled, 115 special

Food Technology Combined program with biochemical engineering Prerequisites 4 semesters of calculus, 4 semesters of college physics, 2 semesters of college chemistry, 6 semesters of college English, history, economics, or allied subjects Recommended 2 semesters each of organic chemistry, food engineering, chemical engineering (food applications), 1 semester each of biochemistry, nutrition, and physical chemistry, 4 semesters of food technology Sc.D also awarded in this field Program administered by Department of Food Technology Faculty 6 full time 38 graduate students enrolled

Geology and Geophysics Geology, geophysics geochemistry crystallography, mineralogy Pre

requisites 4-6 terms of calculus, 6-4 terms of physics, 4-2 terms of chemistry, 6-8 terms of additional physical science, 120 hours—40 semester credits of geology, 10 weeks of summer field work Sc.D also awarded in this field Program administered by Department of Geology and Geophysics Faculty 14 full time, 6 part time 50 graduate students enrolled

Mathematics Algebra, analysis, geometry, hydrodynamics, elasticity, topology, number theory logic, artificial intelligence, probability, differential equations Prerequisites bachelor's degree, good grades in mathematics Recommended five terms of mathematics beyond elementary differential equations Faculty 23 full time 67 graduate students enrolled

Meteorology Numerical and statistical weather predictions dynamics of atmospheric flow patterns, long range weather predictions physical meteorology synoptic meteorology, instrumentation and climatology Combined program with geology and geophysics Prerequisites general mathematics, physics and chemistry requirements for all MIT graduate students Faculty 8 full time 53 graduate students enrolled

Physics Solid state, biophysics, geophysics, theoretical, acoustics, physical optics, X ray emission, physical electronics statistical thermodynamics, X ray diffraction, elementary particle scattering cosmic ray, synchrotron Prerequisites basic physics and chemistry, mathematics through advanced calculus electronics, atomic and nuclear physics, thermodynamics, advanced mechanics, electromagnetic theory, reading knowledge of German and Russian, or German and French, completion of a minor program of study in an area distinct from physics Recommended elementary quantum mechanics, theory of complex variable, optics, modern algebra Faculty 46 full time, 1 part time 155 graduate students enrolled

University of Massachusetts

AMHERST, MASSACHUSETTS

The Graduate School

Graduate courses leading to the degree of doctor of science were offered in botany under Pres

ident Clark and in chemistry under Professor Goessmann as early as 1876. No candidate, however, completed the requirements for that degree. It was not until 1892, under President Henry H. Goodell, that courses leading to the degree of master of science were offered. This degree was first conferred in June 1886 on two candidates. Graduate courses leading to the degree of doctor of philosophy were first offered in 1897, with chemistry, botany and entomology as major and minor subjects. The first degree was conferred on one candidate in June 1902.

In the early years the graduate work was conducted under the direct administration of the President in conjunction with the undergraduate program. The demand for advanced work increased, however, and in June 1908, the trustees made the Graduate School a separate unit in the University.

The purpose of the Graduate School is to provide qualified students with proper guidance in the methods of advanced study and research. Courses are available leading to the degree of doctor of philosophy, master of arts, master of arts in teaching, master of business administration, master of landscape architecture, master of science, master of science in agricultural engineering, master of science in chemical engineering, master of science in civil engineering, master of science in electrical engineering and master of science in mechanical engineering.

Campus is 25 miles from Springfield, 87 miles from Boston. Limited accommodations for graduate students in faculty apartment houses.

Men and women. Summer and evening courses. 11 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: at least 30 course credits must have been earned at this University.

ADMISSION REQUIREMENTS

Bachelor's degree. The applicant must be in the upper half of his graduating class. Admissions Committee requires undergraduate transcript and two letters of recommendation.

Apply to the Dean of the Graduate School at least one month prior to the opening of the semester in which the student plans to register.

FEES AND FIRST YEAR AID

Tuition—in state \$100 per academic year for

full schedule, \$300 for out of state. Room—approximately \$265 per year.

Teaching fellowships providing for tuition and a stipend of \$1,200-\$1,400. Departmental fellowships providing for tuition and a stipend of \$1,500-\$2,200 for the nine-month academic year are open to highly qualified first-year students. A limited number of fellowships paying \$2,000 each are available in the broad field of agriculture. A limited number of tuition scholarships are available for foreign students. Apply by March 1 to The Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Agronomy Prerequisites: a bachelor's degree in a curriculum which includes the necessary prerequisites for this branch of agriculture. Faculty: 6 full-time, 1 graduate student enrolled.

Bacteriology Prerequisites: permission of the department. General chemistry, quantitative and qualitative analysis, organic chemistry, and specified courses in undergraduate bacteriology. Faculty: 7 full-time, 5 graduate students enrolled.

Botany Prerequisites: a bachelor's degree in a curriculum which includes the necessary prerequisites for graduate study in botany. Faculty: 7 full-time, 1 graduate student enrolled.

Chemistry Prerequisites: a bachelor's degree in a curriculum which includes the necessary prerequisites for graduate study in chemistry. Faculty: 12 full-time, 6 graduate students enrolled.

Economics Prerequisites: a bachelor's degree in a curriculum which includes the necessary prerequisites for graduate study in economics. Faculty: 5 full-time, 5 graduate students enrolled.

Entomology Prerequisites: a bachelor's degree in a curriculum which includes the necessary prerequisites for graduate study in entomology. Faculty: 7 full-time, 2 graduate students enrolled.

Food Sciences Prerequisites: acceptance by the Graduate School Admissions Committee and each of the 5 departments concerned. A cooperative major designed for Ph.D. candidates who wish to prepare for research in various phases of the food sciences (involving the Departments of Bacteriology, Chemistry, Dairy Industry, Food Technology and the School of Home Economics (Foods and Nutrition)). Faculty: 27 (5 de

partments) full time 2 graduate students enrolled

Food Technology Prerequisites a bachelor's degree in a curriculum which includes the necessary prerequisites for graduate study in food technology Faculty 6 full time 14 graduate students enrolled

Psychology Prerequisites a bachelor's degree including at least 23 undergraduate credits in psychology a course in laboratory experimental psychology and a course in statistics Faculty 9 full time 15 graduate students enrolled

Zoology Prerequisites a bachelor's degree including at least 20 credits in biology Three letters of recommendation are required Faculty 12 full time 4 graduate students enrolled

Michigan State University

EAST LANSING MICHIGAN

School for Advanced Graduate Studies

This constituent school of a land grant University was established in 1930 with 160 students enrolled in graduate studies Master's degrees were offered as early as 1864 the Ph.D. since 1925 Since 1935 the School has had direct administrative responsibility for students who have reached or passed the master's level Enrollment averages about 600 Allied divisions offer the Ed.D.

Residence halls accommodate 9,000 students single male and female There are nearly 2,000 apartments for married students The Kellogg Center for Continuing Education Kellogg Gull Lake Biological Station field research facilities in all phases of agriculture electronic computer Foreign programs are conducted in Okinawa Viet Nam Colombia and Brazil There is a cooperative program with Argonne National Laboratory a highway traffic safety center a communications research center a bureau of business research, and agricultural and engineering experiment stations

Men and women Summer and evening courses 136 Ph.D.s awarded in 1956-7

Residence requirement for doctorate a minimum of three 12 week quarters beyond the masters

ADMISSION REQUIREMENTS

Evidence of ability to do distinguished work beyond the master's level Standardized tests given to some applicants

Reading knowledge of two foreign languages for the Ph.D. an approved program of study may be substituted for one language

Most departments require qualifying examinations shortly after the student passes master's level Comprehensive examination at the end of programmed course work.

Apply (preferably one month or more in advance of entry) to Registrar Michigan State University

FEES AND FIRST YEAR AID

Tuition—in state \$85 per quarter out of state \$185 Room and board \$240 per quarter for men and women

A few scholarships equivalent to a waiver of tuition and course fees are available Several fellowships valued at about \$1,000 each, and many half time assistantships, at \$150-\$190 per month, are also available Apply before March 1 (preferably earlier) to Registrar Michigan State College

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Agricultural marketing land economics agricultural policy production economics Appropriate bachelor's degree of good quality is required Faculty 40 full time 55 graduate students enrolled

Agricultural Engineering Power and machinery soil and water conservation, farm structures rural electrification, processing of agricultural products Appropriate bachelor's degree of good quality is required Faculty 20 full time 30 graduate students enrolled

Anatomy Comparative histology tissue culture veterinary history Bachelor's degree with good background in biological studies is required Faculty 5 full time 2 part time, 10 graduate students enrolled.

Animal Husbandry Animal production nutrition, breeding meats Appropriate bachelor's degree of good quality is required for admission Faculty 17 full time 2 part time, 20 graduate students enrolled.

Applied Mechanics Properties of materials, fluid mechanics continuous media, dynamics Prerequisites appropriate bachelor's degree of

good quality Faculty 10 full time, 4 part time
10 graduate students enrolled

Botany and Plant Pathology Cytogenetics, mycology, plant pathology, plant physiology, phycology, ecology Prerequisites 1 year of physics, 1 of chemistry, 1 of mathematics, at least one foreign language, appropriate bachelor's degree in biological studies Faculty 28 full time, 4 part time 30 graduate students enrolled

Business Administration Economic analysis accounting, finance, management, marketing Prerequisites appropriate bachelor's degree of good quality in business studies Faculty 20 full time 160 graduate students enrolled

Chemical Engineering Thermodynamics, dry ice, industrial wastes Prerequisites appropriate bachelor's degree of good quality Faculty 6 full time, 1 part time 10 graduate students enrolled

Chemistry Synthetic medicinals, polymers, molecular structure, enzymes Prerequisites appropriate bachelor's degree of good quality Recommended foreign language, good background in physical sciences Faculty 26 full time 120 graduate students enrolled

Civil Engineering Structures, sanitary, highways Prerequisites background equivalent to good bachelor's degree in civil engineering, bachelor's degree Faculty 11 full time, 1 part time 16 graduate students enrolled

Dairy Dairy cattle nutrition and genetics, dairy chemistry and microbiology Prerequisites appropriate bachelor's degree of good quality Faculty 13 full time 25 graduate students enrolled

Economics Labor economics, economic theory, international economics Prerequisites appropriate bachelor's degree of good quality Faculty 25 full time, 11 part time 40 graduate students enrolled

Education Administration, counseling and guidance, reading instruction, agricultural, home economics, industrial arts, physical, health, and recreation education, improvement of instruction (secondary and elementary) educational psychology, history and philosophy of education. Prerequisites appropriate bachelor's degree of good quality Ed.D. also offered in this field Faculty 75 full time 475 graduate students enrolled

Electrical Engineering Electronic circuits, electronics Prerequisites appropriate bachelor's

degree of good quality Faculty 7 full time 19 graduate students enrolled

English American, Renaissance, and medieval literature Prerequisites appropriate bachelor's degree of good quality Faculty 30 full time 30 graduate students enrolled

Entomology Systematic entomology, insect control Prerequisites appropriate bachelor's degree of good quality Faculty 10 full time, 2 part time 11 graduate students enrolled

Farm Crops Plant breeding, production and management research. Prerequisites appropriate bachelor's degree of good quality Faculty 15 full time 18 graduate students enrolled

Fisheries and Wildlife Fisheries and wildlife biology, conservation education. Prerequisites appropriate bachelor's degree of good quality Faculty 7 full time 26 graduate students enrolled

Foods and Nutrition Food needs of women, general foods Prerequisites 2 years of chemistry appropriate bachelor's degree of good quality Faculty 15 full time, 1 part time 10 graduate students enrolled

Forest Products Wood and packing technology, lumber merchandizing Prerequisites appropriate bachelor's degree of good quality Faculty 9 full time, 1 part time 12 graduate students enrolled

Forestry Forest influences, genetics, economics management. Prerequisites appropriate bachelor's degree of good quality Faculty 7 full time 30 graduate students enrolled

Geology Pre-Cambrian research (economic and mineralogical aspects), stratigraphy and sedimentation (Michigan Basin) Prerequisites 1 year of physics, 1 of chemistry, 1 of mathematics, appropriate bachelor's degree of good quality Faculty 6 full time 38 graduate students enrolled

History American, early national period, recent American, Russian, early medieval, French Revolution. Prerequisites appropriate bachelor's degree of good quality Faculty 21 full time, 2 part time 30 graduate students enrolled

Horticulture Food technology, plant breeding, nutrition, plant growth regulation, nutrition physiology Prerequisites appropriate bachelor's degree of good quality Faculty 30 full time 42 graduate students enrolled

Mathematics Applied mathematics, algebra, analysis, geometry, topology Prerequisites ap

appropriate bachelor's degree of good quality Faculty 27 full time 30 graduate students enrolled

Mechanical Engineering Automotive, industrial, thermodynamics, heat transfer, machine design Prerequisites appropriate bachelor's degree of good quality Faculty 11 full time 18 graduate students enrolled

Metallurgical Engineering Prerequisites appropriate bachelor's degree of good quality Faculty 4 full time 3 graduate students enrolled

Microbiology and Public Health Brucellosis virology, sanitary and industrial microbiology Prerequisites 1 year of mathematics, 1 of physics, 1 of chemistry, appropriate bachelor's degree of good quality Faculty 21 full time 65 graduate students enrolled

Music Music education, composition Prerequisites French or German (in musicology), qualifying tests, appropriate bachelor's degree of good quality Faculty 18 full time 31 graduate students enrolled

Philosophy Philosophy of science, logic, social philosophy Prerequisites appropriate bachelor's degree of good quality Faculty 8 full time 6 graduate students enrolled

Physics Infrared spectroscopy, ultrasonics, low temperature physics, magnetic resonance, low energy nuclear physics, solid state physics Prerequisite bachelor's degree of good quality Faculty 18 full time 35 graduate students enrolled

Physiology Thyroid physiology, circulation and renal physiology, comparative physiology, neurophysiology Prerequisites 1 year of physics, 1 of mathematics, 1 of chemistry, appropriate bachelor's degree of good quality Faculty 10 full time 12 graduate students enrolled

Political Science International studies, public administration, Falk politics program, internship in state government and overseas work Prerequisites appropriate bachelor's degree of good quality, MAT Faculty 23 full time 70 graduate students enrolled

Poultry Husbandry Poultry nutrition, poultry technology, Avian physiology Prerequisites appropriate bachelor's degree of good quality Faculty 8 full time 26 graduate students enrolled

Psychology Experimental general, clinical, social, and industrial psychology Prerequisites MAT, appropriate bachelor's degree of good

quality Faculty 13 full time, 2 part time, 66 graduate students enrolled

Sociology and Anthropology Area studies (Latin America and Far East), social psychology, cultural anthropology, rural sociology, industrial sociology, applied social science Prerequisites appropriate bachelor's degree of good quality Faculty 22 full time, 1 part time 45 graduate students enrolled

Soil Science Soil, chemistry, physics, and fertility Prerequisites appropriate bachelor's degree of good quality Faculty 10 full time 40 graduate students enrolled

Speech Rhetoric and public address, radio and TV, speech pathology and audiology, theatre and interpretation, speech education Prerequisites appropriate bachelor's degree of good quality Faculty 10 full time 40 graduate students enrolled

Veterinary Pathology Nutritional pathology, neoplasms, relation of nutrition to infection, in fertility in animals, listeriosis Prerequisites appropriate bachelor's degree of good quality, background knowledge in histology, physiology, biochemistry, biology Faculty 8 full time 12 graduate students enrolled

Zoology Experimental embryology, genetics, physiological and human, histochemistry, ichthyology, ornithology Prerequisites 1 year of physics, 1 of chemistry, 1 of mathematics Faculty 15 full time 50 graduate students enrolled

NOTES

A special program, Ph.D. for college teachers, is offered

University of Michigan

ANN ARBOR, MICHIGAN

Horace H. Rackham School of Graduate Studies

Although the Graduate School was established in 1912, the University actually had provided graduate instruction earlier. The first M.A. was conferred in 1849 and the first Ph.D. in 1876. In 1935 the Horace H. Rackham and Mary A. Rackham Fund provided gifts of a building for the Graduate School of the University and gen

erous endowment for research and for studies in human adjustment. The structure contains lecture halls and reading, study discussion and conference rooms together with facilities for research groups and other graduate organizations. The income from the endowment is used for research and graduate education. Management of the Graduate School is vested in an executive board.

A library of Americana, archaeological, art, and natural history museums, observatories, research facility specializing in child development, nuclear reactor, lake hydraulic laboratory, automotive laboratory. Institutes human adjustment. English language, engineering research, public administration, social research.

School of Dentistry offers DDS, School of Public Health, the DPH, Law School, the SJD, Medical School, the MD.

Summer courses are available. 271 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: one year must be spent in full-time graduate study or research on the Ann Arbor campus.

To transfer, an applicant must provide a letter of recommendation from his former graduate school stating that he would be accepted there in a doctor's degree.

ADMISSION REQUIREMENTS

Selection is based in general upon the quality and scope of academic work.

Apply to Admissions Officer, by August 15 for Fall term, January 1 for Spring, and May 15 for Summer session.

FEEES AND FIRST YEAR AID

Tuition—\$125 per semester for in-state students, \$300 for out-of-state. Room—\$8 per week for men, \$8.10 for women. Board averages \$2.50 per day.

Approximately 20 tuition scholarships and 60 fellowships available with stipends for the latter ranging from \$1,600 to \$1,900. Selection is based on ability, not pecuniary need. Only students with high scholastic records can be considered. Apply between November 1 and February 1 to Dean of the Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Aeronautical Engineering Aerodynamics, propulsion, structure, mechanics of flight, instrumen-

tation. Department participates in Ph.D. programs in instrumentation and nuclear engineering. Prerequisites: B.S. or equivalent, French and German, or others with approval, written and oral qualifying examinations for candidacy for doctorate. Recommended experience in industry or research establishments. Department also supervises the Ph.D. in aerospace, which requires a close specialization in gas dynamics or mechanics of flight and in mathematics and some physics. Faculty: 14 full-time, 10 part-time. 59 graduate students enrolled.

Anatomy Gross anatomy, neuroanatomy, histology, embryology. Prerequisites: 14 semester hours of zoology, 14 of chemistry, 8 of physics, German and French, or Spanish for French with departmental approval, high scholastic record and demonstrated ability to handle English language effectively. Faculty: 21 full-time, 2 part-time. 12 graduate students enrolled.

Anthropology Physical anthropology, archaeology, linguistics, cultural anthropology. Combined program with Near Eastern studies, with human genetics, or with orthodontics. Prerequisites: master's degree in anthropology before beginning Ph.D. program, 4 written examinations, 1 oral, course in quantitative methods in anthropology and field methods in anthropology, if in cultural anthropology. Faculty: 7 full-time, 8 part-time. 44 graduate students enrolled.

Astronomy Solar physics, radio astronomy, astrophysics, galactic structure, stellar spectroscopy, solar system (exclusive of sun). Astronomers sometimes serve as co-chairmen of physics Ph.D. committees. Prerequisites: mathematics through calculus, at least one year of elementary physics, usually a major in either mathematics or physics unless student has an astronomy major, qualifying examination as a placement test, one year of advanced general astronomy and practical observational astronomy (without graduate credit) must be taken unless student has had such a course. Recommended courses in differential equations, intermediate level physics, electricity and magnetism, optics, mechanics and modern physics. Faculty: 10 full-time, 1 part-time. 20 graduate students enrolled.

Bacteriology Bacterial physiology, genetics, metabolism, immunology, viruses, industrial microbiology, tissue culture. Prerequisites: quantitative analysis, organic chemistry, physics, biology. B level in science course for the last two

years of undergraduate training Recommended calculus Faculty 11 full time, 4 part time 44 graduate students enrolled

Biological Chemistry Synthesis degradation and transport of amino acids, protein synthesis, nucleotide and coenzyme synthesis, enzymology, glucosamine metabolism, transport of sugars, of alkali, and trace metals, fatty aldehyde and acid metabolism bacterial mutants (almost all studies employ isotope techniques) Prerequisites general, analytical, and organic chemistry to a total of at least 25 credits (preferably a chemistry major), calculus and physical chemistry (these may be pursued during graduate study), German and French (may be completed during first year of graduate study), high scholastic aptitude Recommended physical chemistry, zoology, micro biology, botany, or general biology Faculty 15 full time, 10 part time 17 graduate students enrolled

Biophysics Molecular biophysics relationships between structure and function of biologically significant large molecules Combined program with departments offering physics, zoology, botany bacteriology, and epidemiology Prerequisites mathematics through calculus, 15 semester hours of physics, 8 of biology Recommended organic chemistry Interdepartmental faculty 2 graduate students enrolled

Botany Anatomy, cytology, ecology and phyto geography, forest pathology, genetics, micro biology, mycology, paleobotany, phytology, phycology, pteridology, taxonomy Combined program with departments offering zoology, bio physics, forestry, conservation, and bacteriology Prerequisite at least 20 hours of botany Recommended morphology, anatomy, physiology, and taxonomy Faculty 11 full time, 11 part time 47 graduate students enrolled

Business Administration Economics, accounting, statistics, marketing finance, industrial management, industrial relations Prerequisites courses required for the M.B.A. (6 hours of accounting, 6 of statistics, 6 of finance, 6 of marketing, and 3 of business law), generally written tests in 3 fields and a preliminary oral Faculty 48 full time, 1 part time 33 graduate students enrolled

Chemical and Metallurgical Engineering Chemical, metallurgical, materials, and science engineering, polymers Programs may be arranged with any other appropriate department

Prerequisites bachelor's degree or equivalent. Faculty 31 full time, 2 part time 156 graduate students enrolled.

Chemistry Organic, inorganic, physical, and analytical chemistry Prerequisites 8 semester hours in general chemistry, 8 of analytical, 10 of organic, 2 of inorganic, 12 of physical, one special library course in chemistry, 3 semesters of physics, mathematics through calculus, one year of German 110 graduate students enrolled

Civil Engineering Structural, hydraulic, soils, highway, and traffic engineering Prerequisites B.S. in civil engineering from institution with civil engineering curriculum approved by E.C. P.D., or similar preparation, preliminary examination for recognition as an applicant for Ph.D. program given by Graduate Guidance Committee—usually after two or more semesters of graduate study Recommended usually require not less than 50 semester hours of graduate study plus research project, may require 60 hours or more, depending on scope of research Doctorate in sanitary engineering also granted in the same field of study Faculty 18 full time, 6 part time 70 graduate students enrolled

Classical Studies Papyrology, Greek drama Combined program with department offering ancient history Prerequisites 16 semester hours of Greek, 32 of Latin (or equivalent—meaning 4 years of preparatory and 16 semester hours) Ed.D. also granted in this field of study Faculty 9 full time, 1 part time 18 graduate students enrolled

Comparative Literature Programs encompass two foreign literatures French Spanish, French German, Russian German, etc. Studies are concerned mainly with generic comparisons This is an interdepartmental program Prerequisites A.B., with concentration in a foreign language or sufficient undergraduate work in a foreign language in order to pursue successfully graduate study in it, also reading knowledge of a second foreign language Recommended a program of study designed to reflect the student's areas of linguistic preparation and interest 15 graduate students enrolled

Conservation Conservation education, natural resources administration, general conservation Combined program with Department of Botany Prerequisites bachelor's degree Faculty 3 full time, 1 part time 14 graduate students enrolled

Economics Theory, money and banking, in

dustrial organization and public control, international economic relations quantitative methods, public finance, economic history Prerequisites undergraduate concentration should be approximated if master's work is to be completed in one year Continuance of graduate work beyond first year depends on record, admission requires no specific courses beyond elementary economics Faculty 23 full time, 15 part time 71 graduate students enrolled.

Education Most popular areas of concentration (of 20 offered) are educational administration, educational psychology, guidance and counseling, physical education, secondary education, elementary education, higher education, child growth and development By special arrangement any academic department may initiate negotiations for interdepartmental programs Prerequisites 15 hours of education, qualifying tests (after June, 1958), 'B' average on the master's level. Recommended three years of experience preferred Ed.D. awarded infrequently Faculty 33 full time, 34 part time 1,720 graduate students enrolled

Electrical Engineering Communications, computers electrical design, measurements and instrumentation, power, electronics, illumination, industrial electronics and control Combined program with instrumentation engineering and nuclear engineering Prerequisites EE 210, electromagnetic field theory, plus cognates as required by student's committee, must pass a preliminary examination given by doctoral committee, must pursue independent investigation in some subdivision of the selected field and present the results in the form of a dissertation, must pass an examination on his research. The graduate student usually completes about 30 credit hours beyond the M.S.E. degree. Faculty 25 full time, 11 part time. 112 graduate students enrolled.

Engineering Mechanics Dynamics, fluid mechanics, elasticity, plasticity Prerequisites B.S. (Eng. Mech.), or equivalent (may be satisfied in chemical, electrical, mechanical, or aeronautical engineering), French and German comprehensive two-part qualifying examination after the M.S.E. level. Recommended student must have equivalent of undergraduate and master's program in field, with a strong cognate in mathematics. Faculty 20 full time, 5 part time. 61 graduate students enrolled

English Language and Literature Ph.D. avail-

able in English literature, language, or general literature Department cooperates with the committee on the Ph.D. in comparative literature. Prerequisites 24 hours of graduate study with an A—average and a good foundation in French and German for admission to Ph.D. program Other doctorates offered in the same field of study Ph.D. in English and Education, Ed.D. Faculty 40 full time, 11 part time 221 graduate students enrolled

Environmental Health Public health engineering, sanitary science, industrial hygiene Prerequisites adequate background in mathematics, natural sciences—physics, chemistry, bacteriology, biochemistry, Spanish may be substituted in special cases for a foreign language, qualifying examinations, if deemed necessary for department to evaluate an applicant's background. Recommended sanitary chemistry, sanitary biology, sanitary engineering Faculty 13 full time, 10 part time. 3 graduate students enrolled.

Epidemiologic Science Epidemiology, immunology, virology, parasitology, bacteriology, microbial biochemistry Combined program with biophysics. Prerequisites biological preparation. Recommended microbiology, vertebrate anatomy, other courses corresponding to the first two years of medical school, two modern languages D.P.H. also awarded by School of Public Health for a program which partly overlaps field covered by Ph.D. Faculty 8 full time, 2 part time. 9 graduate students enrolled

Far Eastern Languages and Literatures Far Eastern (chiefly Chinese and Japanese) languages, literature, and thought. Prerequisites two years of work in some one language offered by the department, reading knowledge of French or German, high scholarship average Administered by the Program in Linguistics. Faculty 4 full time, 1 part time. 2 graduate students enrolled.

Fine Arts European and Oriental art. Prerequisites 3 hour course in ancient, medieval, Renaissance, Baroque, and modern art. Faculty 8 full time. 24 graduate students enrolled.

Fisheries Fishery biology, aquatic physiology, ichthyology, fish management Prerequisites general and inorganic chemistry, economics, comparative anatomy of vertebrates, geology, general invertebrate zoology, comparative physiology, in first year of residence—written departmental qualifying and preliminary examination

Recommended undergraduate science major, summer employment in the field desirable, attendance at a summer biological station or marine laboratory Ph D in ichthyology awarded by Zoology Department Faculty 2 full time, 9 part time 13 graduate students enrolled

Forestry Management, silviculture, economics forest entomology, forest pathology soil and watershed management Comprehensive oral preliminary examinations required Recommended solid basis of successful professional experience before embarking on a Ph D program Faculty 9 full time 9 graduate students enrolled (Master of Forestry is given in the School of Natural Resources)

Geography Far East Europe, USSR Latin America, Anglo America, Australia and Oceania, Near East and Africa, political, historical, settlement, economic, land use and classification recreation, field techniques Combined program with education and Japanese studies Prerequisites A B in geography, or substantial equivalent from a recognized department, general grade average indicating intellectual capacity Qualifying examinations required for Ph D candidacy Faculty 7 full time 50 graduate students enrolled

Geology Petroleum, economic (metals and non metals), structural, glacial, and ground water geology, geomorphology, vertebrate and invertebrate paleontology, micropaleontology, geophysics, stratigraphy, sedimentation, paleobotany, and geochemistry Prerequisites college chemistry and physics, one year of college mathematics, 20 semester hours of geology, including structure, elementary paleontology, petrology, and field camp Faculty 11 full time, 6 part time 66 graduate students enrolled

Germanic Languages and Literatures Language, German, Dutch, and Scandinavian literatures Combined program with linguistics French, and Russian (subject to special arrangements) Prerequisites 8 courses in German plus 4 hours of senior work in literature with an average grade of B Recommended a course in Shakespeare, introduction to philosophy Faculty 7 full time, 2 part time 27 graduate students enrolled

History Ancient, medieval, modern European, British, American, Latin American, Asian, and military and naval history Combined program with Japanese studies and history, Russian stud-

ies and history Prerequisites M A required for admission to Ph.D program Ed D in history sometimes awarded Faculty 23 full time, 7 part time 110 graduate students enrolled

Industrial Engineering Prerequisites for Ph D 60 hours of course work beyond the bachelor's degree, written examination, if required by committee Faculty 5 full time, 8 part time 98 graduate students enrolled

Instrumentation Engineering Measurements, dynamics, probability and information theory, computers, telemetry, data processing, automatic control, nonlinear systems, missile guidance and control Prerequisites see catalog for specific courses, including mathematics, electrical engineering, aeronautical engineering, and others depending upon student's background, two language requirements before candidacy examination Interdepartmental committee 52 graduate students enrolled

Library Science Bibliography, history of books and printing library administration Prerequisites A B with basic program in liberal arts, reading knowledge of French and German Ed D also awarded in this field Faculty 7 full time, 4 part time 168 graduate students enrolled

Linguistics This is a co-operative program under the administration of a committee appointed by the executive board of the Graduate School and is not a department Descriptive linguistics comparative and historical linguistics, linguistic geography Prerequisites basic courses in linguistics or in the history and structure of some particular language or a group of related languages Faculty 2 full time, 17 part time 46 graduate students enrolled

Mathematics Pure, applied, and actuarial mathematics mathematical statistics, history and teaching of mathematics Prerequisites one course for which calculus is a prerequisite Recommended course in physics, reading knowledge of French and German Faculty 46 full time, 19 part time 156 graduate students enrolled

Mechanical Engineering Heat and power, design, fluid flow, thermodynamics Prerequisites M S Some industrial experience is recommended Faculty 31 full time, 1 part time 92 graduate students enrolled

Mineralogy Crystallography, petrography Prerequisites 3 courses in mineralogy, 2 in ge-

ology, 3 in chemistry, 2 in physics, and 3 in mathematics See catalog for specifics Faculty 4 full time 9 graduate students enrolled

Music Musicology, music education Prerequisites musicology—major in music or music literature in an AB or a B.M. program, tests in basic musicianship covering harmony, counterpoint, etc., performance ability on instrumentation or voice as a communications skill A Mus D (performance, composition) and Ed D (music and education) given in the same field of study School of Music and departmental faculties administer the program Faculty 36 full time, 8 part time 48 graduate students enrolled

Naval Architecture and Marine Engineering Prerequisites BSE in naval architecture and marine engineering Recommended one year of experience for each year of graduate study Faculty 4 full time 4 graduate students enrolled

Near Eastern Studies Ancient Near East, Islamic Near East Combined program with anthropology Prerequisites first year of one Near Eastern language Faculty 8 full time, 2 part time 12 graduate students enrolled

Nuclear Engineering Application of energy from nuclear sources to power production, radiation processing of all kinds, and tracer experimentation Theoretical background, as well as specific application, is considered Prerequisites equivalent of Univ of Mich master's degree program 19 hours of nuclear engineering courses plus 11 hours of electives in physics mathematics or engineering, or equivalent (Department recognizes the work at the Oak Ridge School of Reactor Technology as equivalent to master's degree and sets Ph.D. requirements for graduates of that institution accordingly requiring 20 to 30 hours of study plus the thesis). Russian recommended very strongly acceptance by Nuclear Engineering Committee During first semester beyond master's degree, a qualifying examination is required to determine fitness for Ph.D. work Degree in nuclear science also given Faculty 2 full time 10 part time 77 graduate students enrolled

Pathology Prerequisites MD two foreign languages test of competence for advanced study in pathology cognate courses Faculty 17 full time, 1 part time

Pharmaceutical Chemistry Product development, analytical pharmaceutical chemistry, syn-

thetic organic medicinal chemistry Prerequisites BS in pharmacy or chemistry Faculty 4 full time 28 graduate students enrolled

Pharmacology Neuroparmacology, cellular pharmacology (enzymology), chemical pharmacology (drug disposition) toxicology Many students also acquire MD or other professional degrees—D.V.M., etc Prerequisites adequate background in biological and physical sciences comparative to that required for graduate pharmacist or general science major, demonstrated capacity to do satisfactory undergraduate work in the sciences Recommended any specialized work in science either biological or physical Faculty 9 full time 5 part time 16 graduate students enrolled

Philosophy Prerequisites elementary logic, history of philosophy and the equivalent of an undergraduate major in philosophy ordinarily French and German Faculty 10 full time, 6 part time 36 graduate students enrolled

Physics Nuclear, theoretical infrared Prerequisites 15 hours of intermediate physics, plus differential equations, French and German, preliminary examinations plus oral examination Faculty 33 full time 131 graduate students enrolled

Physiology Acid base chemistry and gastric secretion, membrane transport of electrolytes kidney, neurophysiology, cardiovascular physiology, metabolism endocrine, oxygen toxicity Combined program with Mental Health Research Institute Prerequisites mathematics (preferably through calculus), elementary physics, chemistry (including organic and physical), departmental interview Recommended application of physical measurements to biology, electrochemistry, colloid chemistry, zoology Faculty 10 full time 7 graduate students enrolled

Political Science United States national government and county law, state and local, municipal government and administration public administration, political parties pressure groups and public opinion, international law and organization international politics, comparative government (European Asian, Slavonic) Combined program with Slavonic area studies Prerequisites 18 hours of political science including 3 hours of American government which may be taken in addition to graduate program if necessary Recommended courses in international re-

lations, comparative government, and political theory Faculty 24 full time, 3 part time 57 graduate students enrolled

Psychology Clinical, social, industrial, measurement learning, physiological motivation sensory, perception, personality theory, personality assessment, psychotherapy Combined with social psychology program, educational psychology program, and doctoral program in social work and psychology Prerequisites 1 year of college mathematics, 1 of social science 1 of laboratory science, 1 course in statistics, 1 in experimental psychology, MAT Faculty 17 full time, 57 part time 133 graduate students enrolled

Public Health Economics Medical care Prerequisites MPH degree or equivalent preparation Department of Public Health Practice administers the program, Faculty 4 full time 2 graduate students enrolled

Public Health Statistics Prerequisites adequate background in natural sciences and the equivalent of a major in statistics, Spanish may be substituted as a language in special cases, qualifying examinations may be required for individual cases Faculty 6 full time 3 graduate students enrolled

Romance Languages and Literatures French language and literature, Spanish language and literature, Italian language and literature, Romance linguistics Combined program with Departments of Literature, Comparative Literature, and the interdepartmental linguistics program Prerequisite undergraduate concentration in one of the major Romance languages, at least one other Romance language Recommended knowledge of Latin is desirable for all students and is required at the discretion of advisers with reference to certain programs which a student may choose to elect (this requirement may be met after admission) Recommended study and/or travel in the country or countries of Romance language interest Faculty 31 full time, 38 part time 50 graduate students enrolled

Social Psychology This is an interdepartmental program with Departments of Sociology and Psychology participating Prerequisites cultural anthropology, experimental psychology master's degree, or the equivalent, in psychology or sociology, MAT Faculty 17 part time 46 graduate students enrolled

Sociology Population and human ecology, so-

cial organization, social psychology Combined program with Department of Psychology Prerequisites 30 credit hours in sociology, including at least 3 in statistics, master's degree, or its equivalent, a B+ average Recommended 6 hours of advanced statistics, field research experience Faculty 18 full time, 3 part time 51 graduate students enrolled

Speech Public address, oral interpretation, theatre, radio and television, speech science, speech correction, and audiology Prerequisites 20 undergraduate hours in speech for admission with diversification in three fields of speech, 20 graduate hours in speech required for applicants for the doctorate, qualifying examinations required for students with deficiencies in undergraduate training, undergraduate diversification in three fields of speech, graduate diversification in two Faculty 25 full time, 15 part time 90 graduate students enrolled

Wildlife Management Plant and animal ecology, range and forest management, soil and water conservation botany, zoology Combined program with forestry (entomology), conservation, fisheries Prerequisites BS in biological sciences, German and French, or special curricula if desirable as a substitute for one language Special recommendations sometimes made by the graduate committee to strengthen the applicant's training Administered by School of Natural Resources Faculty 4 full time 5 graduate students enrolled

Wood Technology Wood adhesives Prerequisites BS Recommended undergraduate science major Faculty 4 full time 1 graduate student enrolled

Zoology Natural history and ecology, cellular biology, tissue biology Combined program in biophysics with the Physics Department Prerequisites 16 hours of zoology with a grade of B+ or better, organic chemistry, one year of physics, college course in mathematics, statement of the student's special interest in the field Courses in botany are recommended Faculty 24 full time, 15 part time 96 graduate students enrolled

NOTES

Dept of Education offers courses The College Teacher, Workshop for College Professors, and Seminar College Teaching (open to teaching fellows in academic departments only)

Middlebury College

MIDDLEBURY VERMONT

Middlebury College Language Schools

Founded in 1800 as a privately controlled liberal arts college, Middlebury offers graduate work at the master's level in the modern foreign languages, English chemistry and biology. At the doctorate level, the Doctor of Modern Languages was created in 1930 as a degree for teachers rather than primarily for research.

Resident work for the doctorate may be done only in the summer language schools which offer full resident facilities.

There are separate schools and residences with required exclusive use of the foreign language, staffs of native professors, a language laboratory equipped for specialized aural oral work and experimentation in phonetics. The College operates graduate schools of French in France and Spanish in Spain.

Men and women 2 D.M.L.s awarded in 1956-7.

Residence requirement for doctorate equivalent of four summers—one full year of resident study abroad.

ADMISSION REQUIREMENTS

M.A. in the foreign language which will be the major.

A long paper or memoir written in the foreign language.

Apply at any time to the Director of the Language Schools.

FEES AND FIRST YEAR AID

Tuition—\$330-\$375, including room and board for one summer session.

Small scholarships and work opportunities are available. Apply at any time to the Director of the Language Schools.

FIELDS OF STUDY FOR THE D.M.L.

Modern Foreign Languages: French, German, Italian, Russian, Spanish. Students are required to major in one foreign language, take a minor in a second, and have a reading knowledge of a third. A series of oral and written examinations are conducted in the foreign language. A thesis

must be written in the foreign language. Faculty 78 in the summer session. 35 students enrolled for the D.M.L.

University of Minnesota

MINNEAPOLIS 14, MINNESOTA

Graduate School

Although the first degree was awarded in 1888, the Graduate School was not organized as a separate unit until 1905. Work crosses the boundaries of the departments, schools, and colleges comprising the University, including the Mayo Foundation at Rochester. Full and associate members of the faculty number more than 1,000.

A natural history museum, radio station, laboratory for research in social relations, social science research center, theater, hospitals, electron microscopes, human genetics institute, biological station, forest, agricultural research institute, linear accelerator, Van de Graaff generator.

Men and women. Summer and evening courses. 239 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: minimum of three years of graduate study, the first two years or the last year must be spent in residence at the University of Minnesota.

ADMISSION REQUIREMENTS

Satisfactory scholastic record, bachelor's degree or its equivalent, satisfactory character and professional qualifications.

Certain colleges and departments require the student to complete MAT, graduate level. Also, GRE may be requested and special tests required.

Apply at least 4 weeks before the opening of the quarter to 316 Johnston Hall, University of Minnesota.

FEES AND FIRST YEAR AID

Tuition—\$56 plus \$17 fee per quarter for in-state; \$145 plus \$17 fee for out-of-state. Room—\$705 per academic year.

Funds for personal loans are available to students who have satisfactorily completed two quarters in residence. Employment Bureau of the University maintains a file of available jobs on the Minneapolis campus and in the Twin Cities.

Fellowships also open, apply by February 15 to Graduate School, 316 Johnston Hall University of Minnesota, Minneapolis 14 Minnesota

FIELDS OF STUDY FOR THE PH D

Aeronautical Engineering Faculty 11

Agricultural Biochemistry Colloids proteins, carbohydrates, lipids, enzymes cereal chemistry, dairy chemistry, animal nutrition plant biochemistry Prerequisites mathematics through integral calculus, general physics, morganic chemistry qualitative and quantitative analysis, organic chemistry, biochemistry, general biology (or botany or zoology), and general bacteriology Physical chemistry is advised Faculty 8

Agricultural Economics Marketing, farm management, economics of agricultural production, agricultural prices, agricultural policy, farm finance, land economics Prerequisites 18 quarter credits in courses acceptable to the student's adviser Faculty 12

Agronomy Agricultural biochemistry, botany horticulture, plant pathology, plant physiology, soils, and other biological sciences Sufficient credits in plant sciences must be presented to satisfy the adviser Further courses may be required without credit at the option of the adviser The student will find it to his advantage to prepare himself in advance for the language examinations Faculty 4

American Studies American history literature, philosophy and fine arts, social sciences, foreign civilization Candidates enroll in American courses distributed in the five fields named above Prerequisites a major in American studies or history, English, philosophy, art, music, anthropology, economics, education journalism political science, sociology, MAT, graduate level Faculty cooperating departments

Analytical Chemistry Prerequisites the substantial equivalent of the courses in morganic analytical, organic, and physical chemistry required of undergraduate students in the first three years of the chemistry curriculum, one year of college physics, and one year of college mathematics Faculty 4

Anatomy Prerequisites 9 credits in general zoology, elementary courses in embryology, gross anatomy, histology, neurology, and Course 165 6 hematology Faculty 7 Minneapolis, 3 Rochester

Animal Husbandry Animal production, animal breeding Prerequisites 24 quarter credits in

animal husbandry or closely allied subjects Faculty 9

Anthropology Faculty 7

Applied Plant Physiology and Agricultural Botany Prerequisites 27 credits in the basic plant sciences, 9 credits in plant physiology Faculty 6

Art History and criticism of art Prerequisites 27 senior college credits in the history of art or its equivalent Faculty 15

Bacteriology and Immunology Faculty Minneapolis 13, Rochester 5

Biochemistry Combined Ph D program with medicine, pediatrics, clinical pathology, physiology Faculty Rochester 9

Biophysics Prerequisites basic preparation in biology physics, chemistry, and mathematics, with an undergraduate major in any one of these subjects or biophysics Faculty Minneapolis 2, Rochester 4, plus graduate faculty in cooperating Departments of Botany, Physiological Chemistry, Physical Chemistry, Physics Physiology and Zoology

Biostatistics Combined program with statistics Prerequisites satisfactory evidence of high aptitude for quantitative reasoning, supplemented by scientific training of a broad character Recommended college mathematics through integral calculus is desirable, but not essential if there is a compensating breadth in scientific background Faculty Minneapolis 5, Rochester 2

Botany Prerequisites general botany and at least 17 additional credits in botany approved by the department, with consent of the major adviser, credit in related subjects may be substituted Faculty 14

Business Administration Accounting business finance, industrial management, insurance, manpower management, marketing, transportation, economic theory, European economic history, history of economic thought, international economics, monetary theory, public finance statistics Prerequisites a minimum of 9 quarter credits in economics, including principles, an average of B or better in undergraduate work in economics, MAT, graduate level Recommended master's degree Faculty 24

Cancer Biology Cytology and organology, bacteriology, pathology, physiology, and genetics. Prerequisites broad background in laboratory sciences Recommended M D Faculty 4

Chemical Engineering Prerequisites bache

lor's degree in chemical engineering, or its equivalent (if not met, additional preparatory studies as prescribed by adviser), also a year's work in physical chemistry equivalent to Physical Chemistry 101 2 3 with laboratory Faculty 7

Child Welfare Prerequisites undergraduate major in either psychology, sociology, education, home economics, or the equivalent, and at least 12 hours in psychology, 8 in sociology, and 3 in statistics, MAT, graduate level Where background is in other fields, such as nursing or medicine, special adjustments may be made Faculty 16

Civil Engineering Faculty 13

Classics Any three of the courses numbered 51, 52, 53, 73 (see catalogue) Faculty 4

Dairy Husbandry Dairy production, products, and bacteriology. Prerequisites when emphasis is on dairy production, a sufficient preparation in chemistry, genetics, and animal physiology, when emphasis is on dairy products, preparation in bacteriology, chemistry, physics, and economics, when emphasis is on dairy bacteriology, preparation in chemistry, physics, bacteriology, and dairy products Faculty 13

Dermatology and Syphilology Prerequisites satisfactory character and professional qualifications, bachelor's degree in arts and sciences, or its equivalent, M.D., one year's experience as an intern in an approved hospital or as an assistant in a laboratory of an acceptable institution Faculty Minneapolis 4, Rochester 4

Economics Accounting, business finance, industrial management, insurance, manpower management, marketing transportation, economic theory, European economic history, history of economic thought, international economics, monetary theory, public finance, statistics MAT (graduate level) required Faculty 17

Economic Zoology Prerequisites 27 credits in zoology and entomology Depending on the proposed field of specialization with the department, such courses as bacteriology, plant pathology or biochemistry may be accepted in partial fulfillment of this requirement Candidates for the Ph.D. should earn the master's degree under Plan A Faculty 7

Education Prerequisites at least 6 quarter credits in psychology, also a total of not less than 18 quarter credits of undergraduate work in education, including Ed 55A B or Ed 75 A B or the equivalent Faculty 23

Educational Administration Prerequisites at least 6 quarter credits in psychology, also a total of not less than 18 quarter credits of undergraduate work in education, including 55 A B or Ed 75 A B, or the equivalent Faculty 5

Educational Psychology Prerequisites at least 6 quarter credits in psychology, also a total of not less than 18 quarter credits of undergraduate work in education, including Ed 55A B or Ed 75 A B, or the equivalent, MAT (graduate level) Faculty 16

Electrical Engineering Electrical communication, industrial electronics, power engineering Prerequisites completion of the work in the above areas required by the current bulletin of the Institute of Technology of candidates for the B.E.E. or B.S. degree Faculty 18

English Composition, linguistics and comparative philology, foreign literature in translation, American literature Prerequisites not less than 27 quarter credits in English literature, 12 of which must be of senior college grade (including satisfactory courses in Chaucer and Shakespeare) Recommended candidates ordinarily find it necessary to supplement their undergraduate work by a considerable amount of reading Faculty 25

Entomology Prerequisites 27 credits in zoology and entomology Depending on the proposed field of specialization within the department, such courses as bacteriology, plant pathology, or biochemistry may be accepted in partial fulfillment of this requirement Recommended master's degree Faculty 15

Fluid Mechanics Prerequisites candidates will normally have completed undergraduate work in one of the related fields of aeronautical engineering, chemical engineering, civil engineering, mathematics, mechanical engineering, or physics Faculty consists of graduate faculty of cooperating departments

Forestry Prerequisites undergraduate degree in forestry, or its equivalent Faculty 13

French Prerequisites 27 senior college credits or equivalent Faculty 5

Geography Prerequisites introductory courses in physical, social, and economic geography, at least 7 senior college courses in systematic and regional geography, also a substantial minor in some related biological, physical, or social science Faculty 4

Geology Prerequisites elementary courses in

geology, such as mineralogy and rock study, general chemistry, such as inorganic, elementary physics. Students who do not have the necessary undergraduate prerequisites may take them with out credit. Faculty 9

German Linguistics and philology, German literature. Prerequisites 27 senior college quarter credits, or equivalent. Faculty 5

Greek Prerequisites any 3 of the courses numbered 51, 52, 53, 73 or the equivalent. Faculty 4

History Ancient history, medieval and early modern history to 1600, modern European history 1500 to the present, English history, history of the Americas. Prerequisites general survey courses in 2 or 3 of the following areas or periods: ancient, European, English, and American, advanced or senior college courses in 2 of them including at least one course in which intensive work has been done. Faculty 19

Home Economics Prerequisites undergraduate credits in such of the following—social sciences, physical sciences, biological sciences, art and education—as shall be satisfactory to the adviser under whose direction the major work is to be done. In addition the student must have adequate undergraduate training in that field of home economics in which she wishes to specialize. Faculty 18

Horticulture Prerequisites a sufficient amount of work in plant sciences to satisfy the adviser that graduate study in this field may be satisfactorily undertaken. In certain cases further foundation courses may be required without credit. Faculty 8

Industrial Engineering Prerequisites a bachelor's degree in this field or graduation from other engineering curriculums which meet specific requirements. Faculty 2

Inorganic Chemistry Prerequisites bachelor's degree with a major including one year each of organic and physical chemistry, together with calculus, physics, and German, an average of B+ or better. Faculty 9

International Relations Prerequisites an undergraduate major in international relations, an area study, or one of the social sciences. Student without such background may be permitted to enter if he has completed courses prerequisite to those in the fields of graduate study proposed and is prepared to undertake any additional study needed to correct deficiencies in their prepa-

ration. MAT, graduate level, required. Faculty graduate faculty of cooperating departments

Journalism Prerequisites a total of 27 credits in journalism and the social sciences or English distributed as follows—in journalism, a minimum of 15 credits in the basic courses, in one of the social sciences, or in advanced courses in English 12 credits. Student must satisfy adviser he is prepared to take graduate work. Faculty 9

Latin Prerequisites any three of the courses numbered 51, 52, 53, 73, or the equivalent. Faculty 4

Mathematics Algebra, analysis, applied mathematics and/or statistics, geometry and/or topology. Prerequisites 10 credits in calculus, 14 other credits in non-junior college courses. Exceptions may be made in unusual circumstances. Faculty 38

Mechanical Engineering Industrial laboratories, instrumentation, machine design, thermodynamics, steam power, internal combustion engines, heating, ventilating, air conditioning, refrigeration, general mechanical engineering. Prerequisites preparation in the sciences fundamental to mechanical engineering (chemistry, physics, mathematics, mechanics, technical subjects), MAT, graduate level. Faculty 23

Mechanics and Materials Prerequisites adequate preparation in fundamental engineering sciences (mathematics, physics, mechanics, and chemistry). Faculty 10

Medicine Internal medicine, nutrition. Prerequisites satisfactory character and professional qualifications, the bachelor's degree in arts or science, or its equivalent, the M.D., one year's experience as an intern at an approved hospital or as an assistant in a laboratory of an acceptable institution. Recommended: bacteriology, biochemistry, pathology, pharmacology, and physiology. Faculty: Minneapolis 27, Rochester 96

Metallurgical Engineering Prerequisites adequate preparation in the physical sciences and general engineering subjects fundamental to metallurgy. Faculty 3

Metallurgy Faculty 3

Music Music history and literature, theory and composition, music education. Prerequisites working knowledge of piano, performing ability in some phase of instrumental or vocal music, plus 30 undergraduate quarter credits in one of the following branches of music—history and lit

erature, theory and composition, normal piano, or music education. Faculty 16

Neurology Prerequisites satisfactory character and professional qualifications, the bachelor's degree in arts or science, or its equivalent, the M.D., one year's experience as an intern in an approved hospital or as an assistant in a laboratory of an acceptable institution. Faculty Minneapolis 9, Rochester 15

Neurosurgery Prerequisites satisfactory character and professional qualifications, the bachelor's degree in arts or science, or its equivalent, the M.D., one year's experience as an intern in an approved hospital or as an assistant in a laboratory of an acceptable institution. Faculty Minneapolis 3, Rochester 8

Obstetrics and Gynecology Prerequisites same as Neurosurgery supra. Faculty Minneapolis 4, Rochester 10

Ophthalmology Prerequisites see Neurology supra. Faculty Minneapolis 13, Rochester 7

Organic Chemistry Prerequisites bachelor's degree, with minimum average of B from an approved curriculum involving four years of chemistry and including one year each of organic and physical chemistry together with the necessary supporting subjects (integral calculus physics and German). Faculty 9

Orthopedic Surgery Prerequisites same as Neurosurgery supra. Faculty Minneapolis 3, Rochester 8

Otolaryngology Prerequisites see Neurosurgery supra. Faculty Minneapolis 7, Rochester 7

Pathology Graduate students who desire to take their major work in pathology must present credits for the equivalent of the first two years work of the Medical School of this University. A degree with designation, such as M.S. in pathology, is awarded to those who have an M.D. Faculty Minneapolis 8, Rochester 12

Pediatrics Prerequisites general understanding of bacteriology, immunology, pathology, physiology and physiological chemistry, reading knowledge of certain foreign languages. Faculty Minneapolis 18, Rochester 8

Pharmaceutical Chemistry Prerequisites exceptional scholarship and ability in undergraduate courses of this or some other college of pharmacy of equal standing. Consideration will be given to applications of students who are not graduates in pharmacy but whose pattern of un-

dergraduate work includes such training as would implement them to do graduate work successfully with a major in pharmaceutical chemistry. Faculty 7

Pharmacognosy and Pharmacognostic Pharmacology Prerequisites exceptional scholarship and ability in undergraduate courses of this or some other college of pharmacy of equal standing. Faculty 2

Pharmacology Prerequisites in addition to fulfilling requirements for admission to the Graduate School, students should satisfy the requirements for entrance to Medical School. Faculty Minneapolis 4, Rochester 1

Philosophy History of philosophy, logic and epistemology, metaphysics, philosophy of science, ethics, philosophy of religion, aesthetics, social and political philosophy. Prerequisites 18 senior college credit hours in philosophy with a grade average of B or above. Faculty 10

Physical Chemistry Prerequisites substantial equivalent of the courses in inorganic chemistry, analytical chemistry, organic chemistry, and physical chemistry required of undergraduate students in the first three years of the chemistry curriculum, at least one year of college physics, one year of college mathematics. Faculty 11

Physical Medicine and Rehabilitation Prerequisites same as Neurology supra. Faculty Minneapolis 4, Rochester 5

Physics Prerequisites differential and integral calculus, two years of college physics, MAT (graduate level). Faculty 22

Physiological Chemistry Prerequisites acceptable courses in analytical, organic, and physical chemistry. See catalogue. Recommended work in a biological science. Faculty Minneapolis 11, Rochester 5

Physiological Hygiene Faculty 6

Physiology Prerequisites acceptable courses in general zoology or anatomy, general chemistry, organic chemistry, and college physics. Recommended physical chemistry. Faculty Minneapolis 14, Rochester 12

Plant Genetics Prerequisites sufficient credit in plant sciences to satisfy adviser. Faculty 8

Plant Pathology and Botany Prerequisites 27 credits in the basic plant sciences, 9 credits in plant pathology—preferably 18. Faculty 13

Political Science American government and politics, comparative government and politics,

theory, international affairs, political behavior
Prerequisites a student must satisfy his adviser that he is prepared for graduate work in the fields proposed for specialization. Candidates must have a minimum of 27 undergraduate credits in the major, but in exceptional cases completion of courses in other social sciences may be accepted as part of the prerequisites. MAT (graduate level) required. Faculty 18

Poultry Husbandry Prerequisites: evidence of satisfactory preparation. Students will be required to make up deficiencies. Faculty 6

Proctology Prerequisites: same as Neurology. Faculty 3

Psychiatry Prerequisites: same as Neurology. Faculty 11, Minneapolis 11, Rochester 6

Psychology Prerequisites: a student shall satisfy his adviser that he is fully prepared to undertake graduate work in the fields of proposed specialization. In certain cases completion of preparatory courses in the fundamental sciences may be accepted as part of the prerequisites. All students shall have 15 credits of prerequisite work in psychology. MAT (graduate level) required. Faculty 35

Radiology Prerequisites: same as Neurology. Faculty 10, Minneapolis 10, Rochester 9

Romance Languages French, Italian, Spanish. Prerequisites: 27 senior college credits or the equivalent. Faculty 9

Social Work Field work, the social services, human growth and behavior. Prerequisites: satisfactory scholastic record, character, and professional qualifications, a bachelor's degree, 39 quarter credits in social science, i.e., sociology, political science, economics, psychology, history or anthropology, including one or more courses in at least three of these social sciences and a course in statistics. Faculty 30

Sociology Social problems and social policy, social psychology and social processes, social organization and social institutions, rural life and welfare, theories of social change and social order, research methods and techniques. Prerequisites: 18 quarter credits in sociology, MAT (graduate level). Faculty 17

Soils Prerequisites: a good background in chemistry including quantitative analysis, college physics. Recommended: all students should have mathematics through analytic geometry, or

its equivalent, and instruction in calculus. Faculty 8

Spanish Prerequisites: 27 senior college credits, or equivalent. Faculty 4

Speech and Theater Arts Theater, oral interpretation, rhetoric, speech pathology, radio and television, voice science, public address, audiology. Prerequisites: 18 credits in speech, additional reading requirements in dramatic literature for a candidate emphasizing theater are to be selected with the approval of the adviser. A comprehensive entrance examination is a prerequisite for graduate work in theater. Faculty 11

Speech Pathology Prerequisites: 18 credits in speech. Faculty 4

Statistics Prerequisites: for a major in statistics, differential and integral calculus represent a minimum preparation in mathematics, MAT (graduate level). Graduate faculty of cooperating departments

Surgery Prerequisites: same as Neurology. Faculty 37, Minneapolis 37, Rochester 17

Urology Prerequisites: same as Neurology. Faculty 4, Minneapolis 4, Rochester 6

Veterinary Anatomy Prerequisites: a D.V.M., or its equivalent. Faculty 14

Veterinary Bacteriology Prerequisites: a D.V.M., or its equivalent. Faculty 5

Veterinary Medicine Prerequisites: a D.V.M., or its equivalent. Faculty 17, Minneapolis 17, Rochester 1

Veterinary Parasitology Prerequisites: a D.V.M., or its equivalent. Faculty 5

Veterinary Pathology Prerequisites: a D.V.M., or its equivalent. Faculty 10

Veterinary Physiology and Pharmacology Prerequisites: a D.V.M., or its equivalent. Faculty 10

Zoology Prerequisites: Zoology 1, 2, 3, at least 18 credits of advanced work approved by the department, MAT (advanced level). Faculty 14

NOTES

The Graduate School offers courses in Curriculum Trends in American Colleges, Effective College Teaching, Improvement of College Instruction, Directed Experience in College Instruction, Problems in Student Teaching, Professional Education of Teachers (for instructors, administrators and personnel workers in teacher education institutions).

Mississippi State College

STATE COLLEGE, MISSISSIPPI

Graduate School

Though the first graduate degree was awarded in 1885, the Graduate School was not officially authorized by the governing Board of Trustees until January, 1936. The administration of the Graduate School is performed by the Dean, who executes the policies set up by the Graduate Council. The faculty at present does not function as an organized and distinct academic body.

Laboratories, herds, flocks, etc., in animal, dairy, and poultry husbandry, dairy manufacturing laboratory, foundation herd for studies in genetics, nutrition, and similar fields, agricultural experiment station, State Plant Board and Chemical Regulatory and Petroleum Products Laboratories on campus, entomological collections and chemistry library, regional seed laboratory, Patterson Engineering Laboratory, library with particular strength in Southern history and 16th Century Europe. No special dormitories for graduate students, but 13 dormitories on campus and over 170 small student family units, 7 new dormitories to be constructed.

Some evening courses, twelve week summer school. No Ph.D. awarded 1956-7, total enrollment, 357 full time and part time graduate students.

Residence requirement for doctorate three years, at least one of which must be on the campus (the last).

ADMISSION REQUIREMENTS

Bachelor's degree and recommendations from three former instructors. Apply at any time, office of Registrar.

FEES AND FIRST-YEAR AID

Overall fee—\$277.50 for full program, including room in dormitory for two semesters, library, hospital, etc. Out of state tuition—\$200 annually.

Fellowships and assistantships available, ranging from out-of-state tuition to \$1,125, in a few departments research assistantships may exceed \$2,000 for twelve month period.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Sciences Agronomy (crops or soils)

Animal Sciences Nutrition, genetics and animal breeding physiology

Biological Sciences Entomology, zoology
Engineering and Physical Sciences Applied mechanics

Plant Sciences Plant pathology, physiology, taxonomy

Social Sciences History, sociology and rural life agricultural economics

University of Mississippi

UNIVERSITY, MISSISSIPPI

The Graduate School

The University of Mississippi from its formal opening until 1870 conferred honorary M.A.s upon certain graduates. Courses at the graduate level were first offered in 1870, and a definite program was inaugurated in 1890. As a separate academic division the Graduate School was formally organized in 1927. Graduate programs, all administered by the Graduate School, are now offered at University and at Jackson on the campus of the School of Medicine.

New air conditioned library with emphasis on facilities for graduate study. Museum of Art and Archeology, including collection of Greek and Roman antiquities. Separate graduate dormitory for men. Separate dormitory housing, insofar as practicable, for graduate women.

Men and women. Summer courses. Evening courses in certain fields. State control 2 Ph.D.'s awarded in 1956-7.

Residence requirement for doctorate three academic years, including the year for the master's degree.

Transfer requirements: six semester hours may be transferred from a recognized graduate school, providing these hours are recommended by the department concerned as specifically applicable to the student's program. The transfer of graduate credit does not reduce the residence requirement.

ADMISSION REQUIREMENTS

In many fields, a reading knowledge or two years of college work in one foreign language.

Advanced test of GRE, which may be taken immediately after first registration, registration

does not become official, however, until the test has been taken. In certain fields other tests are required.

Apply to the Office of the Graduate School.

FEES AND FIRST-YEAR AID

Tuition—In state \$82.50 per semester, out of state \$100. Room for men \$50 per semester, women \$65.

Available to first year students are non service fellowships at \$600 to \$1,000 and assistantships with stipends depending on the amount of service required. Assistantships for doctoral students, \$1,800-\$2,000. Apply before March 1 to the Office of the Graduate School for non service fellowships and to the department concerned for assistantships.

FIELDS OF STUDY FOR THE PH.D.

Chemistry Organic chemistry and pharmacy. Prerequisites: ordinarily, the master's degree or the equivalent, but in the three year program forty two semester hours of prescribed courses in chemistry, reading knowledge of German, advanced test of GRE. Faculty: 8 full time, 16 graduate students enrolled.

Education School administration. Prerequisites: master's degree with a major in education, advanced test of GRE. Recommended: broad background in education courses, with sound preparation in liberal arts and facility in writing and oral expression. Ed.D. also awarded in this field. Faculty: 12 full time, 1 part time. 47 graduate students enrolled.

English English and American literature. Prerequisites: master's degree with a major in English, competence in one foreign language and a reading knowledge of two foreign languages must be demonstrated early in program, verbal quantitative, and advanced tests of GRE. Faculty: 10 full time, 2 part time. 20 graduate students enrolled.

University of Missouri

COLUMBIA, MISSOURI

Graduate School

University founded in 1839 and advanced degrees offered as early as 1846. Many of the 43 fields

leading to the doctor's degree are organized in the College of Arts and Sciences, but five fields are offered at the School of Mines and Metallurgy in Rolla, Missouri. All graduate work is administered through one organization, comprising the Graduate Faculty and an administrative office consisting of the Dean of Graduate Faculty and administrative assistants.

Professional schools include Agriculture, Business and Public Administration, Education, Engineering, Journalism, Law, Medicine, and Veterinary Medicine. Ed.D. is offered in the School of Education.

Dormitories are provided both for men and women, units are provided for married students.

Facilities in biological work are considered unusual in that on campus graduate work can be done in agriculture, biological sciences, veterinary medicine, and medicine. Library features Western historical manuscripts.

A land grant institution. Summer courses. 30 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: one year must be spent at the University of Missouri.

ADMISSION REQUIREMENTS

Bachelor's degree. Apply, preferably before the beginning of the summer session, to the Director of Admissions.

FEES AND FIRST-YEAR AID

Tuition—\$67.50 per semester. Room and board for men and women: \$280 per semester.

Graduate scholarships, teaching assistantships, and research assistantships are available. Apply to the Graduate Office before March 1 for scholarships, for other appointments, to departmental chairman.

FIELDS OF STUDY FOR THE PH.D.

Accounting and Statistics The program is determined by the Advisory Committee and always includes work in economics and business administration. Prerequisites: substantial completion of the requirements of the undergraduate curriculum in accounting or statistics. Written and oral comprehensive preliminary examination, oral final examination. Faculty: 7 full time, 13 part time. 17 graduate students enrolled.

Agricultural Chemistry Nutrition, physiological chemistry of domestic animals, analysis of agricultural products. Combined program offered with Departments of Animal Husbandry, Poul-

try Husbandry, Chemistry Prerequisites organic, physical, and analytical chemistry, courses in his-
ology, biochemistry, French and German, re-
search to be associated with Experiment Station
projects Qualifying comprehensive and final ex-
aminations are required Recommended teaching
experience while working on degree Faculty 7
full time 21 graduate students enrolled

Agricultural Economics Combined cooperative
program with School of Business and Public Ad-
ministration, with candidates taking about 40 per-
cent of their work in that school Prerequisites
16 credit hours in agricultural economics or gen-
eral economics, or a combination of these, are re-
quired for those enrolling for a master's degree,
candidates for the Ph D must have the master's,
with a major in this department A student may
make up some of these back requirements while
working toward his advanced degree, but these
must be in addition to his years of study for the
advanced degree Language requirements two,
one of which must be French or German Sub-
stitutions sometimes allowed for the second lan-
guage Various tests required on subject matter
work, research, thesis

Other requirements Candidates from institu-
tions not offering work in agricultural economics,
in addition to the two semester's work for a mas-
ter's degree, must complete at least 12 hours of
course work normally taken by undergraduate
students Recommended course work in econom-
ic theory and statistics Faculty 15 full time, 1
part time, 13 extension 27 graduate students en-
rolled

Agricultural Engineering Animal shelter en-
gineering, irrigation, systems engineering, agri-
cultural machinery design and use Prerequisites
BS in agricultural engineering Faculty 11 full
time, 2 part time 12 graduate students enrolled

Anatomy Sex variations in leukocyte counts
and morphology Prerequisites BS or AB de-
gree, with a zoology major, permission of de-
partment. Taught by the School of Medicine

Biochemistry Enzymes, hormones, clinical,
nutrition. Prerequisites mathematics through
calculus; inorganic, organic, quantitative, and
physical chemistry, MS or a qualifying test
Recommended some biology Faculty 4 full
time 6 graduate students enrolled

Botany Anatomy morphology histology, phy-
siology, mycology, plant pathology, ecology, tax-

onomy, bacteriology (microbiology) Interdepart-
mental programs in bacteriology (microbiology)
and genetics are offered Prerequisites baccalaure-
ate degree in botany, or related subjects, dem-
onstrated major interest in some botanical field,
master's, or equivalent, in botany or related field,
qualifying examination given in lieu of master's
Recommended broad botanical or other biolog-
ical background Faculty 7 full time 13 gradu-
ate students enrolled

Ceramic Engineering Ceramics—refractories,
glass enamels Program administered by the De-
partment of Ceramic Engineering at Rolla, Mo
Faculty 2 full time 2 graduate students enrolled

Chemical Engineering Mass transfer, heat
transfer, mixing of dry solids, flow of suspension
through pipes Prerequisites BS equivalent to
that at the University of Missouri, optional ex-
amination of candidate's background by the fac-
ulty Faculty 4 full time 6 graduate students
enrolled

Chemical Engineering Administered by Mis-
souri School of Mines and Metallurgy at Rolla
Faculty 13 full time 1 graduate student en-
rolled

Chemistry Organic, inorganic, physical, ana-
lytical Prerequisites 8 hours of inorganic, 8 of
qualitative and quantitative analysis, 10 of or-
ganic, and 10 of physical chemistry, master's de-
gree unless specifically excused Faculty 12 full
time 29 graduate students enrolled

Civil Engineering Structures Combined pro-
gram with agricultural engineering Prerequisites
BS, structural theory, CE 427, 428, minor in
either mathematics or physics Recommended
theory of elasticity, advanced hydrodynamics,
plates and shells, elastic stability Administered
by the College of Engineering Faculty 10 full
time, 1 part time 22 graduate students enrolled.

Dairy Husbandry Endocrinology, breeding,
nutrition, environmental physiology, dairy bac-
teriology, market milk Faculty 1 full time 9
Ph D candidates enrolled

Economics and Business Finance, business
management, personnel management and labor
relations, marketing, insurance Faculty 12 full
time 1 graduate student enrolled

Education Educational psychology, history
and philosophy of education, school administra-
tion, secondary or elementary education, agricul-
tural education, industrial education, guidance

and counseling, special education Members of other departments frequently used as doctoral committee Prerequisites are determined chiefly by the advisory committee Advisory Test Battery given Ed D also given in this field Faculty 23 full time, 5 part time

English Prerequisites undergraduate major in English (courses in English language or Chaucer, the Renaissance, the 18th century or Milton, the 19th century, American literature, a writing course above the freshman level) Faculty 39 full time, 6 part time About 50 graduate students enrolled

Entomology Taxonomy ecology insect control Prerequisites M.S., or equivalent, in entomology or zoology. German and French Recommended statistics. Faculty 8 full time 5 graduate students enrolled

Field Crops Genetics plant breeding, crop production Combined program with zoology of fered Prerequisites plant breeding or crop production, 26 hours in field crops, botany and soils Faculty 23 full time, 1 part time 11 graduate students enrolled

French Language and Literature Prerequisites some formal training in Old French, reading proficiency in German, reading proficiency in one other foreign language Latin Administered by Department of Romance Language which has 11 full time and 14 part time faculty members 15 graduate students enrolled

Geology Micropaleontology invertebrate paleontology, palynology general geology, glacial geology, stratigraphy Prerequisites undergraduate major in geology, chemistry through qualitative analysis, 8 hours of physics, mathematics through trigonometry, one course in biological science Recommended statistics physical chemistry, calculus, biological sciences as needed by candidate and problem Faculty 7 full time, 6 part time 45 graduate students, including 9 Ph D candidates See next field below

Geology Another field offered by the School of Mines and Metallurgy Mineralogy, mining geology, stratigraphy, paleontology, petrology Prerequisites 19 hours of good basic training in chemistry 18 in mathematics, 10 in physics, reading knowledge of French and German, or reasonable substitute for one Faculty 7 full time, 1 part time 7 graduate students enrolled including 2 Ph D candidates. See above.

History American, English, French, and German history Prerequisites course in introduction to historical research, reading knowledge of two foreign languages (students in American history may apply to the department for permission to substitute a research technique for one language) Faculty 9 full time, 2 part time 35 graduate students enrolled.

Home Economics Foods and nutrition. Department is also developing programs in child development, family life, home management, and family economics Prerequisites courses in foods, nutrition, chemistry, bachelor's degree (not necessarily in home economics), acceptable grade average Recommended teaching, research, statistics 107 graduate students enrolled

Horticulture Growth regulators, antibiotics, root clay exchange of plant nutrients in plants vegetable production management. Work in other departments is involved Prerequisites see catalog German and French 4 Ph D candidates enrolled

Journalism Prerequisites bachelor's, master's, or equivalent. Faculty 20 full time, 10 part time 65 graduate students enrolled

Mathematics Distance geometry, probability theory, topological dynamics and related fields, calculus of variations, algebra Good background, no specific courses required Faculty 11 full time, 30 part time 20-25 graduate students enrolled

Metallurgical Engineering Offered at the School of Mines and Metallurgy Rolla, Mo See catalog Faculty 9 full time 7 graduate students enrolled

Microbiology Medical bacteriology, immunology virology parasitology There is a conjoint program with Departments of Botany and Dairy Husbandry Prerequisites 4-6 hours of general bacteriology, 6-8 hours of general and analytical chemistry, 6-8 hours of organic chemistry, 4-6 hours of general botany or zoology, 5-8 hours of general physics Recommended general mathematics Work done in the School of Medicine. Program administered by Botany and Dairy Husbandry Faculty 4 full time, 2 part time. 7 graduate students enrolled.

Mining Engineering Explosives, mine operations, thermal secondary recovery of petroleum. Prerequisites B.S. basically same as that required by University of Missouri (see catalog) Recommended

mended humanities courses and professional experience Faculty 6 full time, 1 part time 10 graduate students enrolled.

Pathology Experimental pathology Prerequisites M.D., German Faculty 5 full time, 1 part time

Physics Cosmic ray, solid state, X ray diffraction, ultrasonics, theoretical physics Prerequisites 30 hours of physics 25 of mathematics 10 of chemistry Faculty 6 full time, 1 part time 32 graduate students enrolled

Physiology and Pharmacology Prerequisites background in biology, chemistry, and physics, no specific courses called for Faculty 7 full time, 1 part time 6 graduate students enrolled.

Poultry Husbandry Nutrition, poultry genetics, marketing physiology Prerequisites B.S., French, German, Faculty 5 full time, 1 part time 5 graduate students enrolled.

Psychology Experimental, clinical, general psychology Combined program with School of Education in counseling psychology Prerequisites applicants should have an undergraduate major in psychology, MAT Recommended statistics experimental psychology Faculty 6 full time, 8 part time 40 graduate students enrolled.

Sociology and Anthropology Population and race social organization, social psychology, criminology and social disorganization. Prerequisites master's degree, or its equivalent, in sociology or anthropology (or a closely related subject) Students with a deficiency in sociology or anthropology courses may make up deficit by special examination Recommended undergraduate major in sociology or anthropology Systematic examination may be required when student enters the University Faculty 7 full time, 1 part time. 12 graduate students enrolled.

Spanish American Literature Prerequisites formal training in Old Spanish, reading proficiency in German or in Portuguese (the substitution of Portuguese for German will be subject to approval of advisory committee and the committee on educational policy of the Graduate School), reading proficiency in French, Latin. Administered by Department of Romance Languages, which has 11 full time and 14 part time faculty members 15 graduate students, in all Romance languages, enrolled.

Spanish Languages and Literature Prerequisites reading proficiency in German and French,

Latin, formal training in Old Spanish. Same administration and faculty as Spanish American Literature above

Speech and Dramatic Art Speech correction, rhetoric, public address theatre Ph.D. program cuts across other departments Prerequisites the essential core of subjects required for the A.B. degree Faculty 10 full time, 14 part time 12 graduate students enrolled

Zoology Population genetics and animal cytology, population ecology, general and cellular physiology, experimental zoology, mammalogy, embryology, physiology of mammalian reproduction, anatomy, ornithology, game management, ichthyology, fisheries management, limnology Prerequisites 24 hours of zoology, M.A. (in most instances), departmental examination. Faculty 9 full time 19 graduate students enrolled

NOTES

A number of departments offer formal course work in the teaching of their subjects designed for high school and college teachers In other departments graduate assistants are organized (more or less informally) to discuss problems involved in teaching the elementary work in the department

University of Nebraska

LINCOLN NEBRASKA

Graduate College

Graduate instruction began in 1886 In 1896 a Graduate School was organized with a designated faculty under the direction of a dean In 1909 it became the Graduate College, one of ten colleges in the University and is governed by its own faculty It provides adequate vocational training for teachers engineers professional social workers, and investigators, as well as for students who desire to enter the fields of scholarship and research

Dormitories are available summer and winter for single men and women, as well as a few apartments for married students

Summer and evening courses 18 Ph.D.s awarded in 1956-7 Ed.D. also offered as an ad

vanced professional degree in the Teacher's College, which administers the program

A minimum of one academic year, with the major portion of a student's time devoted to graduate study or research on the campus is required for doctorate

ADMISSION REQUIREMENTS

Bachelor's degree Undergraduate courses must meet specific requirements of department or area in which graduate work is to be done

Two years in one foreign language required for admission in Department of Arts and Sciences only Before acceptance as Ph.D. candidate student must demonstrate reading knowledge of two foreign languages (ordinarily French and German)

Oral and written qualifying examinations are prerequisites to acceptance as Ph.D. applicant

Recommended GRE scores desirable in applying for fellowships or assistantships

Apply by May 1 to Dean of the Graduate College for admission in summer session or by July 1 for admission in September

FEES AND FIRST YEAR AID

Tuition—In state \$120 per semester, out-of-state \$240 \$60 and \$120 for 8 week summer session. Room and board in University dormitories cost \$285 each semester

A limited number of fellowships paying \$1,000 to \$1,500 are available to first year graduate students In addition graduate teaching assistantships are available in most departments offering graduate work. These assistantships provide for remission of tuition fees Forty-three tuition fellowships are also available each year File application before March 1 with Dean of the Graduate College

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Prerequisites undergraduate preparation in agricultural subjects (including agricultural economics) and in the social sciences including principles of economics 18 graduate students enrolled

Agronomy Crops or soils Prerequisites good foundation in agriculture and in the basic sciences, especially botany, for students in crops and chemistry and physics for students in soils is essential 35 graduate students enrolled

Animal Genetics Combines study in the fields

of animal, poultry, and dairy husbandry, physiology, and zoology Prerequisites undergraduate preparation in the basic fields of mathematics, physics, chemistry, botany, and zoology, also at least a semester of course work in agricultural subjects New area program.

Bacteriology Prerequisites an undergraduate major in bacteriology with additional basic work in inorganic organic, and biochemistry, two years in one foreign language 8 graduate students enrolled.

Botany (including Plant Pathology) Courses and research are offered in six divisions ecology, morphology mycology, pathology, physiology, and taxonomy Prerequisites undergraduate major in botany one year in zoology and a course in genetics Two years in one foreign language 15 graduate students enrolled

Business Organization and Management Student chooses six fields of specialization from the following accounting, banking finance, insurance statistics, marketing, personnel and labor, foreign trade, economic theory, public finance, transportation, public utilities Prerequisites basic courses in accounting and in principles of economics, and at least a semester of additional course work in economics and business organization 40 graduate students enrolled

Chemistry Inorganic, analytical, organic, physical, or biochemistry Prerequisites basic undergraduate courses in general, analytical, organic, and physical chemistry, and mathematics through integral calculus, two years of German at the undergraduate level are also required 52 graduate students enrolled.

Economics Concentration in economic theory must be supported by work in five fields selected from the following economic history, money and banking, private finance, public finance, insurance, statistics transportation and public utilities, labor problems Prerequisites an undergraduate major in economics which must include basic course in principles of economics 26 graduate students enrolled.

Educational Psychology and Measurements Prerequisites undergraduate preparation in education and in two teaching fields, work in education must include practice teaching, and each student must have at least two years of English 15 graduate students D.Ed. also offered as an advanced professional degree in the Teachers College, which administers the program.

English Prerequisites undergraduate major in English, two years in one foreign language 18 graduate students enrolled

Entomology Students majoring in zoology may elect to do the thesis research in the field of entomology Prerequisites undergraduate major in zoology with basic courses in insect morphology, taxonomy, and economic entomology 3 graduate students enrolled

Geography Specialization may be in either the natural science or the social science aspect Prerequisites undergraduate major in geography, two years in one foreign language 13 graduate students enrolled

Geology Prerequisites an undergraduate major in geology and basic first year college courses in mathematics, chemistry, and physics, two years in one foreign language, for graduate work in paleontology preparation in biology is essential 29 graduate students enrolled

History Ancient, medieval, English, modern European, American to 1829, and American since 1829 (A Ph.D. candidate must show competence in four of these) Prerequisites undergraduate major in history and two years in one foreign language 23 graduate students enrolled

Mathematics Prerequisites basic undergraduate preparation in mathematics, including three courses beyond integral calculus and two years in one foreign language 17 graduate students enrolled

Medical Science Combines work in departments of anatomy biochemistry, internal medicine, microbiology, neurology and psychiatry obstetrics and gynecology orthopedic surgery pathology, pediatrics physiology and pharmacology and radiology and physical medicine

A student may be admitted from any of the following categories 1 students with a B.S. or A.B. who attain an average grade of 7 (85) in a qualifying examination in the basic medical sciences, 2 students with a baccalaureate and the M.D. with an acceptable record, 3 students with a master's degree and the equivalent of two semesters credit in the basic medical sciences, 4 students from the College of Medicine who have a bachelor's degree, who have completed the first two years of the regular curriculum in the College of Medicine, or its equivalent, and who have attained an average grade of 7 (85) in their courses or passed a qualifying examination in the basic medical sciences with a grade of at

least 7 (85) 3 graduate students enrolled

Anatomy Same as Medical Science See above

Physiology and Pharmacology Same as Medical Science See above

Pharmaceutical Science Combines work from departments of pharmacognosy, pharmacology, pharmacy, and pharmaceutical chemistry Prerequisites a master's degree in one of the cooperating departments and adequate prior preparation including (a) at least one semester each of bacteriology algebra and trigonometry, one year in each of biology, organic chemistry, vertebrate physiology and physics, (b) course work in pharmacognosy, pharmacology, pharmacy, and pharmaceutical chemistry totaling at least 18 semester hours 2 graduate students enrolled.

Philosophy Prerequisites undergraduate major in philosophy, two years in one foreign language 15 graduate students enrolled.

Physics Prerequisites undergraduate major in physics, two years in one foreign language, and mathematics through calculus 24 graduate students enrolled

Physiology Combined Ph.D. program students majoring in zoology may elect to do the thesis research in entomology or in physiology Prerequisites undergraduate major in zoology, basic courses in chemistry and physics, and two years in one foreign language 1 graduate student enrolled

Political Science Prerequisites undergraduate major in political science, two years in one foreign language 9 graduate students enrolled.

Psychology Experimental and clinical. Prerequisites undergraduate major in psychology, basic courses in algebra and statistics, and two years in one foreign language, scores on MAT must be submitted 35 graduate students enrolled.

Romance Languages and Literatures French or Spanish Prerequisites undergraduate major in one of the principal Romance languages with supporting work in at least one other, student must demonstrate a reading knowledge of German and Latin 8 graduate students enrolled

School Administration Prerequisites undergraduate preparation in education and in two teaching fields work in education must include practice teaching, and each student must have at least two years of English. D.Ed. offered as an advanced professional degree by Teachers Col

lege which administers program 3 graduate students enrolled

Secondary Education Prerequisites under graduate preparation in education and in two teaching fields work in education must include practice teaching and each student must have at least two years of English D Ed offered as an advance professional degree by Teachers College which administers the program 7 graduate students enrolled

Sociology Prerequisites undergraduate major in sociology two years in one foreign language 12 graduate students enrolled

Zoology Ecology genetics parasitology vertebrate morphology physiology and entomology Prerequisites undergraduate major in zoology two years in one foreign language 15 graduate students enrolled

University of New Mexico

ALBUQUERQUE NEW MEXICO

The Graduate School

The Graduate School was organized in 1917 for master's programs doctoral studies were initiated in 1938 in certain limited fields General supervision is vested in a Graduate Committee which acts for the general faculty Conjointly with the Dean it determines and maintains general policies coordinates graduate activities passes on new programs and approves courses and instructors

Various Southwestern anthropological sites extensive microfilm acquisitions from Spanish and Mexican archives Cooperation is arranged with the Los Alamos Scientific Laboratory for research work by approved doctoral candidates

Men and women Summer and evening courses 16 Ph D's awarded in 1956-7

Residence requirement for doctorate candidate must spend two successive regular semesters following the master's degree or its equivalent, in residence During this period at least one-half the student's time is to be spent in academic pursuits on the campus In these semesters the student shall complete a minimum of 12 semester hours of course work for graduate credit, or an equivalent program of study and research ap

proved by the major department and Graduate Dean Residence requirements may not be satisfied in Summer sessions only

Only B work or above from approved institutions is transferable a maximum of 24 credit hours is acceptable by transfer for the doctorate

FEES AND FIRST YEAR AID

Tuition—\$110 per semester for in state \$210 for out of state Room and board \$317 to \$323 for men \$323 to \$347 for women

Graduate assistantships with stipend of \$1 600 yearly requiring 15-20 hours weekly for laboratory instruction grading, or other services Appointees may carry maximum of 12 semester hours of course work Teaching assistantships at \$1 800 to \$3 600 for academic year open to holders of master's degree Six University Junior Fellowships for first year students with stipend of \$750 Nine University Senior Fellowships with stipend of \$1 000 Apply before March 1 (earlier application encouraged) to the Graduate School Administration 150 University of New Mexico

FIELDS OF STUDY FOR THE PH D

American Studies An interdepartmental program in which nine departments cooperate A candidate however emphasizes American history or American literature Prerequisites MA in such majors as history English education sociology political science philosophy economics minimum of B average in graduate work Prerequisites in history or English (when the MA is not in these fields) are often set GRE (to be taken in first semester of residence) Program administered by a permanent Committee on American Studies 9 graduate students enrolled

Anthropology Archaeology ethnology social anthropology and linguistics A minor is required outside the major field which must amount to one-fourth to one-third of the minimum course requirement Prerequisites a minimum of 12 hours of upper division courses in anthropology GRE (to be taken in first semester in residence) over all B average in graduate work Faculty 5 full time 19 graduate students enrolled

Biology Physiology invertebrate zoology (taxonomy) field vertebrate zoology Prerequisites an undergraduate major or its equivalent with a reasonable distribution in the field of bi

ology, minimum of one year of chemistry, qualifying examination, GRE (to be taken in first semester of residence), at least a B average in graduate work Faculty 8 full time 7 part time 25 graduate students enrolled

Chemistry Physical organic inorganic Pre requisites 8 hours of general 8 of analytical 10 of organic, and 8 of physical chemistry, 1 year of physics, mathematics through calculus GRE (to be taken in first semester of residence), at least a B average in graduate work Recommended second year physics advanced calculus two years of German Faculty 5 full time, 4 part time 20 graduate students enrolled

Education Foundations of education curriculum and instruction administration and supervision, pupil personnel services A 24 hour minor in a subject field, at least 18 semester hours of graduate work in cognate fields outside professional education (e.g., sociology economics, psychology, business administration) are required Prerequisites no specific courses but broad general education and ordinarily bachelor's or master's degree in professional education, an undergraduate major or minor in subject field is assumed as preparation for 24 hour Ph.D. minor in a subject field GRE and MAT, letters of recommendation, samples of professional writing, personal interview some teaching and/or school administration experience Recommended ACE Psychological Examination National Teacher's Examination Program administered by College of Education Ed.D. also awarded in this field Faculty 33 full time 3 part time 142 graduate students enrolled

English British literature, American literature, linguistics Participation in the American Studies program Prerequisites survey of English literature, history of English language, world or classic literature American literature Shakespeare, Chaucer or Milton at least two courses in English literature after 1700 at least two courses chosen from history, philosophy, art or music history, comparative literature, two years of a foreign language required on entry, GRE (to be taken in the first semester of residence), at least a B average in English. Recommended British history, classics further language study Faculty 10 full time 30 graduate students enrolled

History Latin American (especially colonial and recent), United States (especially Revolution, Civil War Southwest), and European (es

pecially medieval, social, Reformation, and recent British) History Department participates in the American Studies program Prerequisites 30 semester hours of history, or the equivalent, including the general survey courses in European and American history, two foreign languages (normally French and German), GRE (to be taken in first semester of residence), at least a B in history Faculty 5 full time 2 part time 14 graduate students enrolled

Mathematics Analysis Prerequisites 12 hours of calculus and geometry, at least 3 hours each of junior senior algebra and geometry, at least 6 hours of junior senior analysis, 3 additional hours from other junior senior courses Students with majors in science and engineering and with mathematics minors are admitted provisionally, subject to deficiency requirements GRE (to be taken in first semester of residence), at least a B average in graduate work Reading knowledge of two foreign languages chosen normally from French, German and Russian Faculty 11 full time 3 part time 50 graduate students enrolled

Modern and Classical Languages Spanish literature Spanish philology, Latin American literature Portuguese and Brazilian literature Prerequisites an undergraduate major in Spanish, with the same requirements as the University's undergraduate major, 30 hours of upper division work including advanced composition and conversation 6 hours of survey of Spanish literature and 2 hours of phonetics, French German, and Latin GRE (to be taken during first semester of residence), at least a B average in graduate work Faculty 10 full time, 1 part time 17 graduate students enrolled

Physics Cosmic rays nuclear physics, electronics atmospheric physics Prerequisites one year each of junior senior mechanics and electricity and magnetism, one semester each of junior senior heat and optics, one semester of junior senior laboratory in heat, optics electricity and magnetism, and electronics, two semesters of advanced calculus, GRE (to be taken in first semester of residence), at least a B average in graduate work, personal conference with Department chairman where feasible Faculty 6 full time 45 graduate students enrolled

NOTES

Dept of Electrical Engineering offers D.Sc

New School for Social Research

NEW YORK NEW YORK

Graduate Faculty of Political and Social Science

Under a charter granted by the Board of Regents of the State of New York the New School awards the MA Ph D M S S c and D S S c for successful study under the Graduate Faculty Curriculum is concentrated in the evening hours classes being held between 6 20 8 00 and 8 30 10 10 The Faculty stresses integration of the social sciences and this is reflected in two of the four degrees it offers—the M S S c requiring 20 points beyond the MA or Ph D in a second social science thesis and oral the D S S c requiring 30 points beyond the Ph D in a second social science dissertation oral examination and defense of dissertation

Research training workshops are held in sociology econometrics and statistics A labor management division functions at the School 15 Ph D s awarded in 1956 7

Men and women Summer courses available Most classes held in evenings

Residence requirement for doctorate 30 points credit in residence

ADMISSION REQUIREMENTS

A B required or equivalent training in a foreign university

Apply to the Graduate Office New School for Social Research by September 5 for the Fall term by January 15 for the Spring term

FEES AND FIRST YEAR AID

Tuition—\$300 per term plus \$6 registration fee for full time study \$25 per credit point \$75 per three credit point course There are no residence facilities

FIELDS OF STUDY FOR THE PH D

Prerequisites two foreign languages and 60 points of credit required in all departments

Economics Faculty 8 full time 9 part time 76 graduate students enrolled

Philosophy Faculty 2 full time 5 part time 40 graduate students enrolled

Political Science Faculty 4 full time 2 part time 73 graduate students enrolled

Psychology Additional prerequisites two terms of statistics Faculty 3 full time, 11 part time 179 graduate students enrolled

Sociology Additional prerequisite one term of statistics Faculty 5 full time 1 part time 99 graduate students enrolled

New York University

NEW YORK CITY

The University received its charter in 1831 It is privately controlled and nonsectarian Three separate units of the University award the Ph D These are listed separately below under the headings Graduate School of Arts and Science (established 1886) Graduate School of Business Administration (1920) and School of Education (1890)

Allied divisions offering doctorates include School of Law (J S D) College of Medicine (M D and D M S) College of Engineering (D E n g S c i) and the College of Dentistry (D D S)

Graduate School of Arts and Sciences

Its urban setting makes possible active collaboration with such institutions as the Metropolitan Museum of Art and the American Museum of Natural History Unique research programs are conducted at the Institute of Fine Arts the Institute of Mathematical Sciences and the Research Center for Human Relations

Men and women Summer and evening courses 140 Ph D s awarded in 1956 7

Residence requirement for doctorate a minimum of three years of residence study of which one year must be at the University

ADMISSION REQUIREMENTS

Baccalaureate degree with an undergraduate background in the desired major field Letter of recommendation

Apply at least one month before the opening of the term Earlier dates vary with the departments

FEEES AND FIRST-YEAR AID

Tuition—\$30 per point

Aid is generally limited to tuition scholarships. Apply to Dean of the Graduate School of Arts and Sciences prior to March 1.

FIELDS OF STUDY FOR THE PH D

American Civilization American political history, economic history, sociology, literature, government, journalism, art, and music. All of the faculty come from other departments. For admission previous academic work is evaluated.

Anatomy Gross anatomy, histology (micro anatomy), neurology. Prerequisites: 1 year each of college mathematics and physics, 2 of college chemistry (including organic), general biology, comparative anatomy, embryology. Recommended: general physiology and genetics, calculus, physical chemistry. Faculty: 8 full time, 11 graduate students enrolled.

Biology Biophysical physiology, cytophysiology and cytochemistry, endocrine physiology, experimental vertebrate morphogenesis, protozoology. Prerequisites: 3 undergraduate years in biology, 1 year each of physics and mathematics, organic chemistry, French or German. Recommended: calculus and physical chemistry. Faculty: 14 full time, 6 part time. 244 graduate students enrolled.

Chemistry Inorganic, organic, physical, and analytical chemistry, including microchemistry. Prerequisites: 1 year course with laboratory in each of the following: elementary chemistry (which may include qualitative analysis), quantitative analysis, organic chemistry, and physical chemistry, calculus (preferably through differential equations), at least one course each in physics and German. B' average in science. Faculty: 21 full time, 1 part time. 149 graduate students enrolled.

Classics Literature, ancient history, linguistics. Combined program in linguistics and comparative literature with other departments. Prerequisites: general knowledge of classical civilization, reasonable competence in translating Latin or Greek prose and poetry. Faculty: 8 full time, 12 graduate students enrolled.

Economics Economic theory and history of economic theories, statistics, economic and financial history, labor problems and social legislation, monopolies, business organization and marketing methods, public utilities, money and bank

ing, public finance, international economic relations. Prerequisite: undergraduate major in economics, or undergraduate major in another social science, or business administration and a minor in economics. Faculty: 12 full time, 4 part time.

English English and American literature, all fields with especial strength in Renaissance, Milton, Age of Johnson, contemporary American novel, drama, poetry. Combined program with other departments in linguistics and comparative literature. Previous academic record in English is evaluated, before the M.A. is conferred. Student must present three undergraduate years of a foreign language or pass a competence test. Faculty: 21 full time, 1 part time. 280 graduate students enrolled.

Fine Arts History of art from classical times to modern, including the Far East. Prerequisites: knowledge of the general history of art and familiarity with the chosen period, French, German, and Italian. Faculty: 9 full time, 3 part time. 106 graduate students enrolled.

Geology Micropaleontology. Prerequisites: 28 undergraduate points in geology, a full year of college work in each of two of the following: chemistry, physics, biology, and at least one full year of college mathematics, ecology, botany, and statistical methods. Faculty: 4 full time, 2 part time. 52 graduate students enrolled.

German Literature and philology. Combined program in linguistics and comparative literature with other language departments. Prerequisites: fundamental grammar and composition, knowledge of the history of German literature. Faculty: 7 full time, 20 graduate students enrolled.

Government Political behavior, public administration and public policy, comparative government, political theory and philosophy, public law, international relations and world affairs, area studies. Faculty: 19 full time, 7 part time. 150 graduate students enrolled.

History Europe (including England) from the fall of Rome to 1500, Europe since 1500, England since 1485, early American and the United States to 1828, the United States since 1828, Latin American, the modern Far East. Urban Business History. Prerequisites: undergraduate major, or 18 points supplemented by work in other social sciences; appropriate language skill with major in European or Latin

American history Faculty 16 full time, 1 part time 142 graduate students enrolled

Mathematics Analysis, applied mathematics, geometry, algebra, numerical analysis and computing, probability and statistics Prerequisite advanced calculus Faculty 25 full time, 2 part time 359 graduate students enrolled.

Meteorology and Oceanography Prerequisite good background in mathematics and physics Faculty 8 full time 18 graduate students enrolled

Music Musicology Prerequisites knowledge of the history of music, competence in harmony, counterpoint, orchestration, and the analysis of the larger forms, French and German (for advanced work, Latin and Italian) Faculty 3 full time, 2 part time 43 graduate students enrolled

Pathology Prerequisites pre medical or pre dental background Faculty 3 full time

Philosophy Metaphysics, existentialism, Marxism, philosophy of history Prerequisite knowledge of history of philosophy Faculty 5 full time 41 graduate students enrolled.

Physics Theoretical physics, electrical distribution in gases, nuclear reactors, nuclear instrumentation, cosmic radiation microwaves, relativity, fluid dynamics, solid state, photoconductivity, X rays, properties of thin films, collision problems in theoretical physics, field theory, nuclear structure Prerequisites undergraduate major in physics, calculus Faculty 18 full time, 2 part time 185 graduate students enrolled

Physiological Sciences Biochemistry, microbiology, pharmacology, physiology, industrial toxicology Prerequisites pre medical or pre dental program Faculty 16 full time, 3 part time 24 graduate students enrolled

Psychology General experimental, social and industrial, and clinical and counseling psychology Prerequisites 12 undergraduate points in psychology, including one semester in experimental psychology, GRE Aptitude and Advanced Psychology, MAT, general undergraduate average of at least 85 Faculty 26 full time 17 part time 256 graduate students enrolled

Public Administration Administrative theory and practice, organization and method analysis, financial administration and fiscal policy, personnel administration, labor and social security administration, planning and housing public relations international and comparative public administration, law enforcement and correctional

administration Faculty 9 full time, 26 part time 48 graduate students enrolled

Romance Languages French, Spanish, Italian, or comparative Romance literatures Combined program in linguistics and in comparative literature with other language departments Prerequisite competence in and knowledge of the literature of the appropriate language Faculty 11 full time, 1 part time 68 graduate students enrolled.

Sociology Sociological theory, social psychology, social organization, cultural anthropology, applied sociology Faculty 8 full time, 7 part time 119 graduate students enrolled.

NOTES

Department assistantships offer experience in teaching skills The many courses offered by the School of Education are available to all.

Graduate School of Business Administration

This School was established as a separate and autonomous school of the University in 1920 The first Ph.D. was awarded in 1938, although earlier the D.C.S. was conferred before it was designated an honorary degree by the New York State Board of Regents

There are no departments or divisions as such in the School, although the 106 faculty members can be divided as follows into the primary areas of business:

Accounting, 11, Advertising, 3, Banking, 9, Corporation Finance, 9, Credit, 1, Business History, 2, Industrial Relations, 4, Insurance, 1, Investments, 11, Economic Theory, 6, Foreign Trade, 6, Law, 3, Management, 12, Marketing, 6, Personnel Administration 4, Political Economy, 3, Public Finance, 1, Public Utilities, 3, Real Estate, 2, Statistics, 5, Taxation 4

There was an enrollment in 1956-7 of 4,124 men and 225 women

Located in the heart of New York's financial district, the School has a library of over 40,000 volumes of specialized business books and a reference collection of services and materials unique in the fields of investment analysis and investment banking Residence facilities available for men and women at Washington Square, N.Y.

Men and women. Summer and evening courses 12 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate a minimum of 40 points graduate work completed in residence at the Graduate School of Business Administration.

ADMISSION REQUIREMENTS

Baccalaureate degree in arts, science, philosophy, or letters, or evidence of graduation from a technical school of standing equal to that of the College of Engineering of NYU

Apply by writing to the Chairman of the Committee on Admission, Graduate School of Business Administration, New York University, 90 Trinity Place, New York 6, New York, prior to August 30 for Fall semester, prior to January 4 for Spring semester

FEES AND FIRST YEAR AID

Tuition—\$60 for each two point graduate course, \$120 for each four point graduate course, on a per point per term basis of \$30, with the normal classroom load of a full time student 12 points per semester. Normal load for fully employed student is 8 points

Scholarships and fellowships ranging from part tuition to \$3,000 per academic year. Also teaching fellowships available with the joint sponsorship of the undergraduate college of business (the School of Commerce, Accounts, and Finance), providing remission of tuition and stipend of \$2,500 per year. Apply for scholarship and fellowship assistance to the Dean, Graduate School of Business Administration, NYU., 90 Trinity Place, New York 6, NY., prior to March 15

FIELDS OF STUDY FOR THE PH.D.

Accounting
Corporation Finance and Investments
Domestic Marketing
Economic and Financial History
Economic Theory and History of Economic Thought
Industrial Organization and Control
International Finance and International Trade
Labor Problems and Industrial Relations
Money and Banking
Political Economy
Public Finance and Taxation
Public Utilities and Transportation

Real Estate and Land Economics *Statistics* *Taxation*

Candidate must select five fields from the above group for concentration of study and for doctoral defense. In all cases two of the five must be economic theory and the history of economic thought, and economic and financial history. There are also language, statistics, and dissertation requirements

School of Education

The School of Education has two divisions: Division of Professional Education and Division for the Scientific Study and Advancement of Education

Men and women. Summer and evening courses

Residence requirement for doctorate one year, which may include a summer session

ADMISSION REQUIREMENTS

Student should obtain check list of steps from Room 53A, Press Building, Washington Square

Doctorate candidates must have reading knowledge of two languages or one language and statistics

GRE recommended

Apply to Admissions Office, School of Education, Washington Square, New York 3, New York

FEES AND FIRST YEAR AID

Tuition—\$30 per point

Limited number of scholarships and fellowships available. Apply to the Dean of Students

FIELDS OF STUDY FOR THE PH.D.

General Administration of Public School Systems, Adult Education, Art Education, Business Education, Communications in Education, Dramatic Art, Early Childhood and Elementary Education, Educational Psychology, Educational Sociology, English Education, Foreign Language, Guidance and Personnel Administration, Hebrew Culture and Education, Higher Education, History of Education, Home Economics, Human Relations, International Relations Education, Integrated Education, Mathematics, Music Education, Nurse Education, Philosophy of

Education, Physical Education, Health Education, Recreation, and Physical Therapy, Religious Education, Safety Education, Science Education, Secondary School Service Junior High School, Senior High School, Social Studies and History, Speech Education, Vocational Education, Industrial Arts Education, Arts and Crafts Occupational Therapy, Vocational Rehabilitation

State University of New York

ALBANY 1, NEW YORK

This institution consists of 28 units distributed in 22 communities of the State Graduate study leading to the Ph D is conducted by three institutions College of Forestry, Syracuse, Downstate Medical Center, Brooklyn, Upstate Medical Center, Syracuse

The graduate program was initiated at the time of the establishment of the University in 1950 The Graduate Council has general responsibility for standards and conduct of the graduate program Responsibility for planning and conducting particular programs rests with the faculty and administration of the specialized unit

Under a contractual arrangement, Cornell University operates the Colleges of Agriculture Veterinary Medicine, Home Economics, and Industrial and Labor Relations, responsibility for the graduate program rests with Cornell At Alfred University a similar arrangement exists with the College of Ceramics Inquiries concerning these graduate programs should be addressed directly to the graduate faculties at Alfred and Cornell

15 Ph D s awarded in 1956 7

Residence requirement for doctorate at least one year

ADMISSION REQUIREMENTS

Undergraduate degree Ability for independent scholarship, adaptability and interest in a particular program

Apply to the Chairman of the Graduate Committee at Downstate Medical Center, 450 Clarkson Ave., Brooklyn 3, N Y, Upstate Medical Center, 766 Irving Ave., Syracuse 10, N Y, College of Forestry, Syracuse 10, N Y

College of Forestry

FEES AND FIRST YEAR AID

Tuition—none for in state, \$150 for out of state

Limited number of fellowships Apply to the chairman of the Graduate Committee

FIELDS OF STUDY FOR THE PH D

Biological Sciences Forest botany, entomology, and zoology Prerequisites bachelor's degree, preferably in forestry or the biological sciences, two languages, or one language and statistics Administered by Division of Biological Sciences Faculty 17 full time 28 graduate students enrolled

Physical Sciences Forest chemistry and utilization, pulp, paper, and wood technology Prerequisites bachelor's degree, preferably in physical sciences, two languages, or one language and statistics, entrance examination Program administered by the Division of Physical Sciences Faculty 21 full time 59 graduate students enrolled

Resource Management Forest management and economics, silviculture, landscape architecture Prerequisites bachelor's degree, preferably in forestry or the biological sciences, two languages, or one language and statistics Program administered by Division of Resource Management Faculty 17 full time 26 graduate students enrolled

Colleges of Medicine at Brooklyn and Syracuse

FEES AND FIRST YEAR AID

Tuition—\$100 per semester, \$7 per semester hour for part time study totaling less than 15 semester hours Board and room—about \$25 per week For information, write Student Personnel Office

A limited number of fellowships Apply to Chairman of the Graduate Committee

FIELDS OF STUDY FOR THE PH D

Anatomy Beginning anatomy Prerequisites 16 hours of chemistry, 6 hours each of biology, physics, English, and a foreign language Recommended additional training in physics, mathematics, chemistry, and biology Faculty 9 full time 1 graduate student enrolled

Biochemistry Enzymology Prerequisites a

major or its equivalent in chemistry with a minimum of one year each of general analytical, organic and physical chemistry a minimum of one year each of mathematics physics and biology or zoology two years of a foreign language Recommended courses in anatomy genetics bacteriology calculus and statistics Faculty 8 full time 2 graduate students enrolled

Microbiology Prerequisites sufficient work in biology to have a general comprehension of disciplines and methods some idea of taxonomy morphology embryology histology genetics ecology organic chemistry physics statistics and languages major or minor in biology Faculty 6 full time

Pharmacology Prerequisites evidence of undergraduate proficiency in elementary zoology chemistry (including qualitative analysis and organic) physics mathematics, verbal self expression and one foreign language. Faculty 6 full time. 3 graduate students enrolled

Physiology Prerequisites basic pre medical or pre engineering education, with emphasis upon physics organic and physical chemistry and mathematics Recommended course work during the graduate program can be reduced correspondingly if satisfactory work in comparative anatomy embryology and histology is included in the predoctoral program Faculty 9 full time

North Carolina College at Durham

DURHAM NORTH CAROLINA

The Graduate School of Arts & Sciences

In 1939 the General Assembly of North Carolina authorized the establishment of graduate work in liberal arts and the professions in the North Carolina College at Durham. As a consequence of this legislative action graduate courses in the arts and sciences were first offered in that same year. In 1951 authorization was given to offer the degree of Doctor of Philosophy with a major in education. This new program, offered by the Department of Advanced Studies in Education, is designed to pro-

vide opportunities for advanced study and research for high caliber graduate students

In 1955 the Department of Education entered its new building—a building designed specifically for work in the various areas of this field. It contains a statistics laboratory a bureau of educational research an audio visual laboratory and recording unit and extensive facilities for training guidance workers and counselors

During 1956-7 five students were enrolled for the Ph.D.—three full time two part time Faculty of twelve—eleven full time one part time In 1957 one person received the Ph.D. degree with a major in education During the regular academic year all graduate courses are given during the afternoon and evening

Minimum residence requirement for the doctorate three academic years or six semesters of full time graduate study or their equivalent of shorter units of academic residence A student is required to spend at least one academic year of full time study in continuous residence on the campus

ADMISSION REQUIREMENTS

Bachelors or masters degree from a recognized college or university, an average grade of B or better in at least 20 semester hours of work in education essential for unconditional admission GRE Applications for admission, with transcripts of academic records should be filed in the office of the Dean of the Graduate School at least 30 days before admission is to take place

FEEES AND FIRST YEAR AID

Total general expenses for one year for in state students boarding students—\$538.50, non boarding students—\$196.50 Total general expenses for one year for out-of state students boarding students—\$908.00 non boarding students—\$566.00

A limited number of graduate assistantships available Stipends vary in amounts but average \$400-450 a year

FIELDS OF STUDY FOR THE PH.D.

Education is the only area in which the Ph.D. is awarded Areas of specialization in doctoral program elementary education, secondary education administration and supervision, and guidance.

North Carolina State College

RALEIGH, NORTH CAROLINA

The Graduate School

This is one of the divisions of the Consolidated University of North Carolina. The Consolidated Graduate School is administered by the Vice President for Graduate Studies and Research and a Graduate Council composed of representatives from the administrative boards of each of the units of the University. Graduate programs in each unit are administered by a Dean of Graduate Studies on each campus. At State College the Dean is assisted in all matters of policy by an Administrative Board of seven members, five of whom are elected by the faculties of the degree granting schools and the remaining two by appointment by the Chancellor after consultation with the Dean.

Graduate instruction at State College is organized to provide opportunity and facilities for advanced study and research in agriculture, engineering, forestry, technological education, and textiles.

Nuclear reactor, North Carolina Agricultural Experiment Station, Department of Engineering Research, Institute of Statistics.

Men and women Summer courses 34 Ph.D. awarded in 1956-7.

Residence requirement for doctorate: a minimum of 6 full semesters of work beyond the bachelor's degree, or 2 years of full time study beyond the master's.

ADMISSION REQUIREMENTS

Bachelor's degree, B average or better in undergraduate work. Provisional admission for students lacking essential undergraduate work, deficiencies must be made up before admission to full graduate status can be granted. Students with lower scholastic average must take GRE or National Teacher's Examinations if recommended by department head.

Apply to Dean of Graduate Studies, Graduate Office, North Carolina State College, Raleigh, N.C., at least 30 days in advance of the semester in which admission is sought.

FEES AND FIRST YEAR AID

Tuition—\$61 to \$142 per semester for resu-

dent students, \$105 to \$317 for non residents, depending upon number of hours. Fees slightly lower in second semester. Room—\$69.50 per semester. Board—approximately \$500 per year in college dining hall.

Half time teaching assistantships at \$2,000, half time research assistantships, \$1,800 to \$2,400 available. Apply to Dean of Graduate Studies in compliance with the rulings of A.A.U. and American Association of Land Grant Colleges and State Universities.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Theory, policy, farm management, land economics, marketing, economic development, and econometrics. Minors are taken in economics history and political science, rural sociology, statistics, and in technical agricultural fields. Prerequisites: advanced standing, reading knowledge of two languages may be completed during period of study, GPA of B or better in previous course work, application approved by departmental graduate committee. Program administered by School of Agriculture. Faculty: 8 part time, 12 graduate students enrolled.

Animal Industry Animal nutrition, animal pathology, animal breeding, animal husbandry, dairy husbandry, dairy bacteriology, meat processing, dairy chemistry, dairy manufacturing, physiology of reproduction and lactation, rumen physiology, animal parasitology. Combined program with statistics, biochemistry, and genetics. Prerequisites: B.S., with background in bacteriology, dairy technology, chemistry, mathematics, animal science. Recommended: fundamental courses in mathematics, chemistry, physics and biology. Program administered by School of Agriculture. Faculty: 35 full time, 1 part time, 34 graduate students enrolled.

Botany Plant physiology, morphology. Prerequisite: good undergraduate background. Program administered by School of Agriculture. Faculty: 8 full time, 12 graduate students enrolled.

Chemical Engineering Fluid dynamics, heat transfer, distillation, diffusion, physical properties of binary liquid systems, liquid liquid extraction, solid liquid contacting. Prerequisites: acceptable curriculum in chemical engineering or allied area (chemistry, metallurgy, nuclear engineering). Program administered by School of

Engineering Faculty 8 full time, 3 part time
19 graduate students enrolled

Electrical Engineering Computers dielectrics networks Prerequisites background equivalent to master's work at this institution in electrical engineering, GRE, if scholastic record is not good Program administered by the School of Engineering Faculty 8 full time 3 part time 19 graduate students enrolled

Entomology Taxonomy toxicology ecology applied entomology Combined program with pathology and chemistry Prerequisites fundamental training in chemistry mathematics and biological science GRE recommended Program administered by School of Agriculture Faculty 16 part time 15 graduate students enrolled

Experimental Statistics Statistical genetics, sample survey theory and design, experimental design, response surface studies and econometrics Combined program with genetics and animal industry Prerequisites undergraduate calculus, GRE if average is below B Recommended undergraduate (or master's) degree in mathematics statistics or some applied field Program administered by School of Agriculture Faculty 18 full time 1 part time 44 graduate students enrolled

Field Crops Plant breeding weed control for age crop production and crop production Prerequisites BS in agronomy field crops botany, biology or related fields letters of recommendation Recommended chemistry through organic, mathematics through calculus Program administered in School of Agriculture by the Department of Genetics Plant Physiology Soils and Statistics Faculty 29 full time, 5 part time 23 graduate students enrolled

Forestry Wood technology silvics genetics, forest management Program administered by the School of Forestry Faculty 14 full time 25 graduate students enrolled

Genetics Plant cytogenetics population dynamics (theoretical and as applied to experimental populations), effects of radiations and other mutagenic agents on heredity and development A joint major with experimental statistics is possible Ph.D. may be taken in any of the following departments under the supervision of an Associate Member of the Genetics Department Animal Industry Field Crops Poultry Horticulture, Experimental Statistics Prerequisites un-

dergraduate degree in biology or agriculture, German and French (or Spanish), preliminary examination Recommended MS in biology or agriculture, one semester teaching undergraduate laboratory course in genetics Program administered by the Department of Field Crops Animal Industry, and School of Forestry Faculty 4 full time 7 graduate students enrolled

Mineral Industries Ceramic engineering GRE required if academic record is questionable Faculty 6 full time 9 graduate students enrolled

Physics Nuclear physics reactor theory Combined program with the Oak Ridge National Laboratory and Brookhaven National Laboratory Prerequisites BS in engineering or physics with an average of B- 41 graduate students enrolled

Plant Pathology Fundamental work in phyto pathology, including diseases caused by fungi, bacteria nematodes and viruses Prerequisites basic training in biology at least B average in biological sciences GRE recommended Program administered by School of Agriculture Faculty 12 part time 16 graduate students enrolled

Soils Soil chemistry, soil physics soil fertility, soil morphology, and soil microbiology Combined program offered with statistics field crops, agricultural economics and plant physiology Prerequisites good background in basic science, including mathematics physics chemistry, and biological sciences, at least 16 hours in soils Program administered by School of Agriculture Faculty 26 full time 20 graduate students enrolled

Zoology Animal ecology and wildlife conservation and management Combined program with animal parasitology with the University of North Carolina Department of Zoology Prerequisites B average in major field, which must be some phase of biological sciences, BS Program administered by School of Agriculture Faculty 7 full time 1 graduate students enrolled

University of North Carolina

CHAPEL HILL NORTH CAROLINA

The Graduate School

Although the Graduate School was organized in 1903 the first Ph.D. had been conferred 20 years

previously The School has jurisdiction over all graduate and post graduate degrees except professional degrees in medicine, law, and dentistry This Institution is also known as the University of North Carolina at Chapel Hill and is a part of the Consolidated University of North Carolina See North Carolina State College, which is also a part of the Consolidated University

Allied divisions offering doctorates include the School of Medicine, the School of Law and the School of Dentistry

Separate residence halls for graduate men and women Collection of Southern history and documents of the 48 states, institutes for research in the social sciences, natural sciences humanities, statistics, and government Human relations area files, herbarium, arboretum, psychometric laboratory, University Press Member of the Oak Ridge Institute for Nuclear Studies

Men and women Summer courses 95 Ph D s awarded in 1956 7

Residence requirements for doctorate three full years of graduate study in residence, at least one year must be in continuous residence at this institution

Recommendations required of transfer students

ADMISSION REQUIREMENTS

Bachelor's degree, GPA of B or better in the field proposed for graduate study

Reading knowledge of French and German or substitutions recommended by the department as pertinent to the student's research program GRE, including the Advanced Test

Apply to Dean of the Graduate School at least 30 days before opening of term

FEES AND FIRST YEAR AID

Tuition—in state \$150 per year, out of state \$500, other fees \$88 Room—\$131.50 for each occupant of a double room (for 9 months), \$192 for women Board—\$60 a month in the University cafeteria

Limited number of scholarships at \$1,550—\$2,000, plus tuition Apply to the Dean of the Graduate School before March 1

FIELDS OF STUDY FOR THE PH D

Bacteriology and Immunology Bacterial physiology, pathogenic bacteriology, immunology,

medical mycology, and virology Prerequisites general, analytical, and organic chemistry, general physics, basic biology courses M D also awarded in this field Program administered by the School of Medicine Faculty 6 part time 14 graduate students enrolled

Biochemistry and Nutrition Lipids, metabolism of phospholipids, nucleic acids, amino acids bone formation and tooth structure, urinary calculi, and enzyme chemistry Prerequisites general, analytical, and organic chemistry, general physics, and basic courses in biology M D also awarded in this field Program administered by the School of Medicine Faculty 5 part time 6 graduate students enrolled

Botany Mycology plant physiology, cytology, plant anatomy, taxonomy Prerequisites 27 semester hours in biology, with emphasis on plant biology Recommended general chemistry and general physics Faculty 1 full time, 5 part time 23 graduate students enrolled

Chemistry Analytical, inorganic, organic, physical Prerequisites courses usually required in B S in chemistry program, calculus Faculty 4 full time, 9 part time 63 graduate students enrolled

Classics Latin or Greek Prerequisites undergraduate major in classics, Latin and Greek, in addition to French and German Faculty 1 full time, 6 part time 11 graduate students enrolled

Comparative Linguistics An interdepartmental curriculum Prerequisites broad undergraduate preparation in languages, with an undergraduate major in one, reading knowledge of several languages Faculty 8 part time 1 graduate student enrolled

Comparative Literature Interdepartmental curriculum Prerequisites broad undergraduate preparation in literature with a major in one field, reading knowledge of several languages Faculty 11 part time 2 graduate students enrolled

Economics and Business Administration Economic theory, accounting, econometrics economic history, international economics, labor, industrial management marketing, monetary theory, personnel private finance, public finance, public policy, statistics transportation Prerequisites at least 30 hours in economics and business Recommended general psychology, calculus, American government, and history Faculty 6 full time, 28 part time 89 graduate students enrolled

Education Educational psychology, elementary education history and comparative education, guidance and personnel work, physical and health education secondary education, educational administration and supervision Prerequisites at least 18 hours, including educational psychology, special tests of aptitude and mastery of English language Recommended none or more years of teaching experience Ed D also awarded in this field Faculty 6 full time, 20 part time 216 graduate students enrolled

English Old English language and literature Middle English language and literature the Renaissance English language of the 17th and 18th centuries, English literature of the Romantic and Victorian periods American literature, British and American literature of the 20th century Prerequisites strong undergraduate major in English language and literature, Latin, in addition to French and German. Faculty 5 full time, 17 part time 97 graduate students enrolled

Geology and Geography Geology structural, economic, mineralogy, sedimentary, petrology, geophysics, geomorphology, stratigraphy, paleontology, Geography economic A student who takes a major program in geography must have a minor in geology Prerequisites a strong undergraduate major in either geology or geography, with supporting courses in the other, general chemistry Recommended general physics and calculus for geology majors Faculty 8 part time 21 graduate students enrolled

Germanic Languages Literature and linguistics Prerequisites undergraduate major in German, some residence in Germany Faculty 2 full time, 4 part time 11 graduate students enrolled.

History Ancient, medieval, modern European, English with related work in European, United States and Latin America with related work in United States Prerequisite undergraduate major in history Recommended economics, political science, classics, philosophy, and sociology as needed Faculty 1 full time, 17 part time. 55 graduate students enrolled.

Industrial Relations An interdepartmental curriculum. Includes courses in the Departments of Economics, Sociology, Political Science, Psychology History, and in the Schools of Business Administration, Education, and Law Prerequisites strong undergraduate preparation in history, economics, sociology, and business, with emphasis on labor relations Faculty 12 part time 2 graduate students enrolled.

Mathematics Algebra, theory of numbers, analysis, applied mathematics, geometry, topology Prerequisite undergraduate major in mathematics Faculty 2 full time, 13 part time 28 graduate students enrolled

Music Musicology Prerequisites AB with music major, music diagnostic test, more than two languages in certain instances Faculty 7 part time 30 graduate students enrolled

Pharmacy Pharmaceutical chemistry and pharmacy Prerequisite BS in pharmacy Faculty 7 part time 9 graduate students enrolled

Philosophy Logic, ethics and value theory, epistemology metaphysics, aesthetics ancient or modern philosophy Prerequisite undergraduate major in philosophy Faculty 6 part time. 6 graduate students enrolled.

Physics Biophysics, nuclear, molecular, solid state, low temperature, and field physics Prerequisite broad background program in physics and mathematics Recommended courses in chemistry and biology Faculty 1 full time, 7 part time 19 graduate students enrolled

Physiology Endocrinology, blood, neurophysiology, metabolism, renal physiology Prerequisites general zoology, general physics, chemistry through organic M.D. also awarded in this field Faculty 5 part time 5 graduate students enrolled

Political Science Government and politics in the United States, public administration, foreign and comparative government, international affairs, and political theory and jurisprudence Prerequisite undergraduate major in political science. Recommended related courses in economics, history, geography, and anthropology and sociology Faculty 12 part time 41 graduate students enrolled

Psychology Experimental, clinical, statistical, personnel Prerequisites undergraduate major in psychology, MAT and GRE Recommended calculus Faculty 19 part time. 40 graduate students enrolled.

Public Health Public health education, biostatistics, parasitology, sanitary science. Prerequisites broad training in the natural and social sciences, at least one year of experience. Doctor of Public Health also awarded in this field Faculty 35 full time, 3 part time 96 graduate students enrolled

Romance Languages French as a major, and Italian and Spanish as minors, Spanish as a ma

major and French and Italian as minors, Romance philology as a major, with French, Spanish, and Italian literatures as minors **Prerequisites** undergraduate major in a Romance language, with a minor in a second Romance language, Latin, Spanish, and Italian, in addition to French and German, 6 months residence in a country that employs the language of major interest **Faculty** 3 full time, 12 part time 44 graduate students enrolled

Sociology and Anthropology Sociology, rural sociology, cultural anthropology **Prerequisite** undergraduate major in sociology or anthropology **Recommended** broad general training in the field of social sciences **Faculty** 5 full time, 13 part time 46 graduate students enrolled

Statistics Fundamental concepts of statistics, probability, inductive inference, the design of experiments Combined programs include mathematical statistics with experimental statistics, the latter is available in biostatistics, psychology, economics, sociology and at the North Carolina State College of Agriculture and Engineering at Raleigh **Prerequisite** mathematics, at least through advanced calculus **Recommended** a field of application, such as economics, psychology, public health, sociology **Faculty** 7 full time 28 graduate students enrolled

Zoology Protozoology, invertebrate zoology, cytology, embryology of invertebrates cell physiology, hydrobiology, vertebrate zoology, genetics, marine ecology **Prerequisite** undergraduate major in zoology **Recommended** supporting courses in botany **Faculty** 2 full time, 7 part time 15 graduate students enrolled

NOTES

Departments employing graduate students as teachers conduct informal seminars for such students under the guidance of the professor in charge of the courses

University of North Dakota

GRAND FORKS, NORTH DAKOTA

The Graduate School

Established in 1925, although graduate instruction had been offered earlier Ph.D. and Ed.D.

offered since 1925 Graduate School controlled by Graduate Council

US Bureau of Mines Lignite Laboratory in Grand Forks helpful in research in lignite Special facilities for doctoral candidates working in US history relating to this region

Men and women Summer and evening courses 3 Ph.D.'s awarded in 1956-7

A minimum of one academic year of residence required for doctorate

ADMISSION REQUIREMENTS

Graduation from an accredited college or university

Apply to Office of the Graduate School between December 15 and July 15

FEEES AND FIRST YEAR AID

Tuition—In state \$73, out of state \$133

Rooms—\$3.50 to \$5 per week for men or women **Board**—\$12-\$15 per week

Scholarships from \$250 to \$1,000, half time assistantships \$1,200 to \$1,800 Apply to Office of the Graduate School before March 15 for the following academic year

FIELDS OF STUDY FOR THE PH.D.

Anatomy Combined program with biochemistry, physiology, and pharmacology Competence in field is prerequisite **Faculty** 5 full time 4 graduate students enrolled

Biochemistry Combined program with physiology, pharmacology, and chemistry Competence in the field is prerequisite **Faculty** 5 full time 10 graduate students enrolled

Biology Ants and ant larvae Combined Ph.D. program with departments of geology, bacteriology, physiology and pharmacology, and education Competence in the field is the prerequisite **Faculty** 4 full time, 1 part time 3 graduate students enrolled

Chemistry Competence in field is prerequisite **Faculty** 9 full time 15 graduate students enrolled

Economics Combined program with departments of history, political science, and education Competence in field is prerequisite **Faculty** 4 full time 10 graduate students enrolled

Education Educational administration, secondary and elementary education Competence in field is prerequisite, as well as experience as teacher or administrator Ed.D. also awarded in

this field of study Faculty 8 full time, 12 part time 400 graduate students enrolled

History Northern Great Plains area Competence in field is prerequisite Combined program with departments of education economics, and political science Faculty 6 full time 15 graduate students enrolled

Physiology and Pharmacology Combined program with departments of biochemistry and anatomy Competence in field is prerequisite Faculty 4 full time 8 graduate students enrolled

Psychology Experimental psychology Combined program with educational sociology Competence in field is prerequisite Ed D also awarded in this field Faculty 4 full time 5 part time 20 graduate students enrolled

North Texas State College

DENTON TEXAS

Graduate School

The School of Music, through the Graduate School, offers work leading to the Ph.D. in musicology, music theory and composition The School of Education offers Ed D in various fields of education

Men and women State control Limited summer courses 2 Ph.D.s awarded in 1956-7

Residence requirements for doctorate minimum of one full year of residence on campus Transfer students not accepted

ADMISSION REQUIREMENTS

Master of Music or Master of Arts with adequate work in musicology theory and composition

Reading knowledge of French and German, Latin, Spanish, Italian, and others as research may require

Required tests for degree—preliminary qualifying, and oral final examinations

FEES AND FIRST YEAR AID

Tuition—In state \$69, Out-of state \$219 Board—\$220 per semester

FIELDS OF STUDY FOR THE PH D

Music Musicology, composition, theory Pre requisites Master of Music or Master of Arts with adequate work in fields of musicology, theory and composition, reading knowledge of French and German, piano simple score reading Recommended reading knowledge of Latin, Spanish Italian and other languages as research may require Faculty 15 full time 12 graduate students enrolled

Northwestern University

EVANSTON AND CHICAGO, ILLINOIS

The Graduate School

In 1910 the Graduate School was organized as the administrative center for the doctors and masters degrees, although the first Ph.D. had been conferred 14 years previously Programs of study leading to the Ph.D. are available in all departments of the College of Liberal Arts and in all professional schools of the University (except Law)

The School of Music offers the Doctor of Music

Computing center with digital and analogue computers Van de Graaff accelerator, observatory gas dynamics laboratory, Ipatieff high pressure and catalytic laboratory, audiology and speech correction clinics television and radio studios program of African studies, transportation center, center for metropolitan studies Special collections on Africa Japanese politics and government in the 20th century French Revolution, Horace papers of Charles Dawes, Spanish plays

Men and women Summer and evening courses 150 Ph.D.s awarded in 1956-7

Residence requirement for doctorate one academic year (three consecutive quarters) in full time continuous residence

Transfer students must spend a minimum of four quarters in residence

ADMISSION REQUIREMENTS

Undergraduate degree, rank at least in the upper half of class

Knowledge of one foreign language highly desirable

GRE recommended

MAT required in Psychology Department

Apply to the Graduate School, Evanston, at least five weeks before the date of registration

FBS AND FIRST YEAR AID

Tuition—\$660 Health Service fee \$10 per quarter Room—\$10 \$15 per week Board—\$480

Full tuition scholarships, University scholarships (tuition plus \$300), fellowships for students showing unusual promise (tuition, plus \$1 200, assistantships during the first year in certain departments Apply to the Graduate School, except for Engineering, Medicine, Journalism, Music (apply to individual school), before March 1

FIELDS OF STUDY FOR THE PH D

Anatomy Gross anatomy, developmental anatomy and histology, neuroanatomy Prerequisites BS or AB, with (generally) creditable grades in courses listed in catalog as medical school requirements, interview to determine depth of interest and nature of objective Recommended German and French Program administered by School of Medicine Faculty 7 full time, 4 part time 4 graduate students enrolled

Anthropology Ethnology, with emphasis on aesthetics, Africa, Asia Part of interdisciplinary Program of African Studies Recommended some undergraduate preparation in the social sciences Faculty 5 full time 16 graduate students enrolled

Art History of art and American architecture, art education Combined program with School of Education leading to the Ed D also offered Prerequisites a good foundation in history of art, literature, history, and philosophy Faculty 7 full time, 2 part time 9 graduate students enrolled

Astronomy Photographic astrometry, theoretical astrophysics Prerequisites AB or BS in astronomy, mathematics, or physics, particular interest in the field of research carried out by the observatory Faculty 2 full time 1 graduate student enrolled

Bacteriology Tuberculosis, multiple sclerosis,

virus complement fixation, tissue culture, immunity, chemotherapy Recommended biological sciences and chemistry Program administered by Medical School Faculty 6 full time 6 graduate students enrolled

Biochemistry Prerequisites one year of general chemistry, one of college physics, mathematics through calculus, qualitative and quantitative chemistry, one year of organic chemistry and of physical chemistry Recommended more than one year of organic chemistry, if possible Program administered by Medical, Dental, and Liberal Arts Schools Faculty of Department in Medical School 7 full time 8 graduate students enrolled

Biological Sciences Ecology, embryology, entomology, genetics, invertebrate zoology, parasitology, physiology, protozoology, taxonomy Combined programs are possible with the Chicago Museum of Natural History and with biochemistry in collaboration with the Chemistry Department Prerequisites a good background in biology, chemistry, and mathematics, at least a reading knowledge of one foreign language, statement of particular interests to determine whether needs can be met in the Department Faculty 14 full time 35 graduate students enrolled

Business Production, marketing, business finance, bank management, investment finance, sales management, industrial relations, accounting, transportation, business administration, statistics Combined program with economics and other social sciences Ordinarily students are admitted on basis of their master's program, but unusually well qualified applicants may be considered on the basis of an undergraduate degree in a field closely allied to their proposed doctoral study Recommended one foreign language related to possible research area Faculty 60 full time, 5 part time 158 graduate students enrolled

Chemical Engineering Kinetics, advanced thermodynamics, process and process control, unit operations Prerequisite undergraduate degree in engineering, or major study in closely related field Faculty 8 full time 24 graduate students enrolled

Chemistry Analytical, inorganic, physical, and organic chemistry, biochemistry Combined program in chemical physics offered with Physics Department. Prerequisites general, analytical,

organic, physical chemistry, general physics, calculus (exceptions made for particularly promising students) Recommended second year of physics, German, additional mathematics, for biochemists biology and German instead of foregoing Faculty 24 full time 68 graduate students enrolled

Civil Engineering Structural and sanitary engineering, soil mechanics, fluid mechanics, transportation and traffic engineering water resources Direct combined program with theoretical and applied mechanics, indirect with mechanical, chemical, or electrical engineering, metallurgy and Transportation Center Prerequisite undergraduate degree in engineering, or major study in closely related fields Faculty 10 full time, 12 part time 53 graduate students enrolled

Classics Latin and Greek language and literature, Greek and Roman history Combined program in ancient history field with History Department, minor fields in related areas such as English, Romance languages, Germanic literatures, philosophy, etc Prerequisites adequate knowledge for graduate work of Greek or Latin, background in classical literature and ancient history Recommended GRE, reading knowledge of French or German Faculty 4 full time 6 graduate students enrolled

Dentistry Orthodontics, pedodontics pathology and bacteriology, chemistry Combined program with Chemistry Department, Medical School, and Liberal Arts College Prerequisite DDS, or equivalent, including at least 2 years of liberal arts college, or a minimum of a bachelor's degree Recommended statistics Faculty 13 full time, 12 part time 39 graduate students enrolled

Economics Economic theory, history, public finance money and banking, international trade, institutional organization and prices, labor economics, statistics and econometrics, economics of transportation, economic development Doctoral candidates may elect one field from the other social sciences or the School of Business Combined program with Transportation Center and the Program of African Studies Prerequisites ordinarily an undergraduate major in economics or another social science, but high caliber students admitted with only introductory mathematics or a major in mathematics. Student must obtain reading knowledge of two foreign languages, or of one and training through calculus in mathe-

matics GRE recommended Faculty 14 full time 37 graduate students enrolled

Education Elementary, secondary, and teacher education, guidance and counseling, school administration Prerequisites minimum of 16 semester hours or 24 quarter hours in undergraduate courses in education, adequate undergraduate preparation in areas other than professional education Recommended some professional experience Ed D also awarded in this field Faculty 17 full time 180 graduate students enrolled

Electrical Engineering Electronic tubes, communication circuits, control systems, analysis of power systems, microwaves, non linear circuits, radiation and propagation, electroacoustics, analog and digital computers Prerequisite undergraduate degree in engineering or major study in closely related field Faculty 10 full time, 6 part time 85 graduate students enrolled

English Chaucer and Middle English, Renaissance and 17th century, 18th century, Romantic period, Victorian period, American literature, 20th century English literature, drama, criticism. Prerequisite adequate undergraduate preparation in English literature Other doctorate in this field Oral Interpretation, Drama (given by the School of Speech) Faculty 36 full time, 20 part time 87 graduate students enrolled

Geography Regional geography of Anglo America, Latin America Europe and the Soviet Union, Asia, and Africa economic, urban, transportation and political geography, physiography, cartography Combined program with the Program of African Studies and with the Transportation Center Prerequisite basic training and requirements of a master's degree in geography Faculty 7 full time 30 graduate students enrolled

Geology Regional stratigraphic analyses, sedimentology, petrology and structure of the Precambrian, statistical analyses in geological problems, glaciology Opportunities exist for cooperative research with other departments Prerequisites general and historical geology, paleontology, mineralogy, petrology, and structural geology Adequate field experience and courses in college physics, physical chemistry, and calculus are prerequisites for the master's Preference given to students with strong backgrounds in related sciences and mathematics Faculty 7 full time 19 graduate students enrolled

German Language and literature. Combined

program with linguistics Prerequisites under graduate major in German, or its equivalent Recommended reading knowledge of Latin, residence in Germany Faculty 8 full time 6 graduate students enrolled

History American, English history, European fields and Far East Combined program with African Studies Prerequisite adequate training in history and allied disciplines Recommended French and German, or one of these and another modern or classical language Faculty 11 full time 37 graduate students enrolled

Journalism Journalism and public affairs, journalistic management, social aspects of mass communications, communications research Prerequisites A B, equivalent of master's degree in journalism from Northwestern Recommended 2 years practical experience in journalism Faculty 13 full time, 8 part time 5 graduate students enrolled

Mathematics Analysis, algebra, algebraic geometry, functional analysis, probability and statistics, differential geometry, topology, numerical analysis Prerequisite undergraduate major in mathematics, or equivalent preparation in closely related areas (e.g., physics) Recommended advanced calculus, reading knowledge of French, German, or Russian Faculty 20 full time, 1 part time 17 graduate students enrolled

Mechanical Engineering Thermodynamics, heat transfer, gas dynamics, aerothermochemistry, transport phenomena, stress analysis, elasticity, kinematics, dynamics and vibrations controls and instrumentation, linear programming, operations research, methods time measurement, data processing, computers, statistical quality control Joint programs possible with Transportation Center, the Business School, and departments offering civil, electrical, and chemical engineering, as well as metallurgy, chemistry, physics, and mathematics Prerequisite undergraduate degree in engineering, or major study in closely related fields Faculty 11 full time, 6 part time 60 graduate students enrolled

Metallurgy Mechanical, chemical, and physical metallurgy, metal physics Prerequisite B S in any field of engineering, physics, chemistry, mechanics, or mathematics Faculty 5 full time 16 graduate students enrolled

Music Music education, history and literature, theory Prerequisites 75 hours of general cultural subjects, plus adequate grounding in the

field of specialization Ed D and Doctor of Music also given in this field Program administered by the Schools of Music and Education. Faculty 10 full time, 4 part time 80 graduate students enrolled

Pathology Biochemistry and pathology of myocardial infarction, factors influencing growth of experimental tumors pathology of glomerulonephritis, congenital heart disease Prerequisites courses related in the field of specialization, one language to be approved by the department. Program administered by the Medical School Faculty 10 full time, 10 part time 6 graduate students enrolled

Pharmacology Cardiac glycosides shock, local anesthetics sympathomimetic amines, histamine Prerequisites general and organic chemistry, zoology, general physics, mathematics through algebra Recommended personal interview, physical chemistry, mathematics beyond algebra Program administered by the Medical School Faculty 4 full time, 4 part time 5 graduate students enrolled

Philosophy Metaphysics, epistemology, aesthetics, ethics, value theory, logic contemporary philosophy, history of philosophy, philosophy of religion Combined program with Education Department in the philosophy of education Prerequisite undergraduate major in philosophy, or in closely related areas Recommended at least one foreign language Faculty 7 full time 13 graduate students enrolled

Physics Solid state physics, nuclear physics, nuclear magnetic resonance, low temperature physics, spectroscopy, electrical discharges gases Combined program in chemical physics, also cooperative programs with electrical engineering and metallurgy Prerequisite normally an undergraduate major in physics, or strong preparation in closely related sciences and engineering Faculty 16 full time, 1 part time

Physiology Respiratory, cardiovascular, gastrointestinal, neural, and endocrine fields Prerequisites background in chemistry, physics, and mathematics is strongly recommended, medical background desirable Program administered by the Medical School, also Comparative Physiology in the Biological Division of the University at Evanston Faculty 6 full time, 1 part time 4 graduate students enrolled

Political Science International relations, comparative politics, American politics and govern

ment, public law, methodology (scientific theory in political science) Combined program with Geography Department and the Program of African Studies Prerequisite undergraduate preparation in political science or in another social science. Recommended at least one foreign language, mathematics (especially statistics) Faculty 6 full time, 2 part time 21 graduate students enrolled

Psychology Experimental, clinical, social Prerequisites psychology major, MAT, undergraduate background in mathematics Faculty 9 full time, 5 part time 47 graduate students enrolled

Romance Languages French and Spanish language and literature Combined program occasionally with German or English. Prerequisites undergraduate major in the language and literature in question for the Ph D, an M A in the field, at least two Romance languages Recommended foreign residence, some knowledge of Latin Faculty 19 full time, 1 part time 18 graduate students enrolled

Sociology Methodology, systematic sociology and theory, social organization and disorganization, demography, ecology, urban sociology, social psychology Combined programs with courses from sociology, psychology, anthropology and speech, with Center for Metropolitan Studies in geography, in the Program of African Studies, and with the Transportation Center Prerequisites students are urged to complete an M.A. before going on for the Ph D Faculty 6 full time, 1 part time 20 graduate students enrolled

Speech (Interpretation) Prose, poetry, drama Combined program with English, French, etc. Prerequisite undergraduate major in speech, or undergraduate major in literature with some training in speech. Faculty 4 full time 8 graduate students enrolled

Speech (Public Speaking) Rhetoric, public address, persuasion, argumentation, group processes Prerequisite adequate undergraduate preparation in speech, or in closely related areas. Combined program with history and psychology Faculty 9 full time 14 graduate students enrolled

Speech (Radio Television, and Film) History and criticism. Prerequisite adequate undergraduate preparation in speech, or in closely related areas Recommended some experience in educational or commercial broadcasting. Facul

ty 6 full time 16 graduate students enrolled

Speech (Speech Correction and Audiology) Stuttering, cleft plate, audiology, special education Combined program with psychology, education, and medicine Preference is given to applicants with preparation in at least one of the following areas speech and speech science, psychology, biology, special education Faculty 10 full time 47 graduate students enrolled

Speech (Speech Education) Elementary, secondary, college. Combined program with Department of Education Prerequisite preparation in speech and closely related areas Recommended courses in education and psychology Ed D also awarded in this field Program administered jointly by Departments of Education and Speech Faculty 2 full time 9 graduate students enrolled

Speech (Theatre) Theatre history, dramatic literature, production Combined program with Fine Arts Department Prerequisite undergraduate preparation in theatre or theatrical literature, or in closely related areas Recommended extracurricular interest in theatrical productions Faculty 9 full time 26 graduate students enrolled

NOTES

Teaching assistantships under supervision are available.

University of Notre Dame

SOUTH BEND, INDIANA

Graduate School

Although some Ph D s were awarded earlier, the chief development of the Graduate School has taken place in the last 25 years Graduate instruction for a master's degree is offered in 27 departments

There are residence facilities for priests and brothers on campus, limited residence facilities for sisters on campus, some apartments in Vetville for married students with children, and rooms in homes around the University for unmarried students

Enrollment is restricted to men and sisters. Lay women may be admitted to summer sessions

and evening courses, although those sessions of fewer courses leading to the master's degree only 33 Ph D's awarded in 1956-7

Residence requirement for doctorate a minimum of three full years of study in residence, a master's degree counting as one year

Transfer students must submit GRE scores and letters of recommendation including several from graduate teachers

ADMISSION REQUIREMENTS

An undergraduate degree, with a major in the field of study or adequate preparation in the field chosen for graduate study

A reading knowledge of French and German, one to be satisfied in the first year and the second no later than the second year. Another appropriate modern language may be substituted for one. In addition, Latin is required for work in English, philosophy, and medieval studies

GRE (Aptitude and Advanced tests in the major field), January administration of GRE in National Program for Graduate School Selection Area tests given in an Institutional Testing Program do not suffice

Apply prior to June 1 to Dean of the Graduate School

FEES AND FIRST YEAR AID

Tuition \$900 Room \$30 \$40 per month, off campus

Tuition scholarships, assistantships, especially in laboratory sciences, grants in aid student employment

Apply with application for admission, January 1-March 15, to Dean of the Graduate School. This deadline cannot be met unless the GRE is taken in November or January

FIELDS OF STUDY FOR THE PH D

American Studies Cooperative program with major in American history or literature, plus courses in philosophy and social sciences. Prerequisites undergraduate major in one of the areas above and fundamental courses in the others

Biology In zoology physiology, parasitology, radiation biology, anatomy and morphology, genetics, etc., in botany ecology, pathology, physiology, mycology. Prerequisites organic and inorganic chemistry, mathematics physics, general

botany, general zoology, and 18 semester hours in the major sequence (zoology or botany). GRE, a summer course at a marine biological station before the conferring of the degree. Faculty 11 full time, 1 part time 18 graduate students enrolled

Chemistry Organic, inorganic, physical, biochemistry. Combined program permissible with physics, chemical engineering biology, or microbiotics (Lobund Institute). Prerequisites the standards of the American Chemical Society, GRE, orientation entrance examination. Faculty 20 full time, 1 part time 73 graduate students enrolled

Economics Industrial relations, economic philosophical relationships. Prerequisites undergraduate major in economics, or a social science with courses in economic theory, history of economic ideas and institutions, statistics, GRE. Faculty 12 full time, 14 graduate students enrolled

Education History and philosophy of education, administration, guidance. Prerequisites at least 12 credits in education, including principles or philosophy of education, educational psychology, methods, GRE. Recommended a year of teaching experience. Faculty 5 full time, 2 part time 24 full time and 20 part time graduate students enrolled

Engineering Mechanics Hydrodynamics, plasticity. Prerequisites mathematics physics, engineering sciences major in mechanics, or equivalent. Sc D also awarded in this field. Faculty 5 full time, 1 part time 8 graduate students enrolled

English Middle English literature Victorian, American. Part of American Studies combined program. Prerequisites undergraduate major in English, or 8 semester courses distributed among courses in writing and in literature, Latin, GRE. Faculty 18 full time, 1 part time 30 graduate students enrolled

Gnotobiotics (production and study of organisms isolated from all other species or in association with recognized species). Pure, germfree production of vertebrates, biochemistry, bioengineering, microbiology, physiology. Prerequisites undergraduate degree in science, with at least five semesters (or its equivalent) of biology, five of chemistry (including physiological chemistry or biochemistry), two semesters of mathematics and two of physics, GRE, French and German. Supporting courses are taken in the Biology and

Chemistry Departments Administered by Lobo Institute

History Medieval and modern European (particularly French and English history of the 19th century), United States political, cultural, and religious history Combined program with American Studies Prerequisites 24 semester credits in history, including surveys of US history and West European history, GRE, qualifying examination for full status as a graduate student of the department, Latin (for medieval history) Doctor of Medieval Studies also granted in this field Administered by Medieval Institute Faculty 13 full time 30 graduate students enrolled

Mathematics Algebra, analysis (function theory, differential equations, topology, abstract set theory, number theory, functional analysis) Prerequisites mathematics major, courses through differential and integral calculus, differential equations and some reasonable experience with basic ideas of modern algebra, GRE Faculty 22 full time, 1 part time 29 graduate students enrolled

Medieval Institute Western medieval civilization editing of medieval texts Combined program with History, Philosophy, and English Departments The degree offered is Doctor of Medieval Studies but the student may take the PhD by meeting the requirements of the appropriate department Prerequisites BA degree, with courses in medieval history, languages and literature, scholastic philosophy, French, German and a good knowledge of Latin, GRE Faculty 2 full time 4 graduate students enrolled

Metallurgy Order disorder transformations, X ray analysis, phase diagram studies Prerequisites BS in metallurgy, or equivalent Faculty 4 full time 10 graduate students enrolled

Philosophy History of ancient and medieval philosophy, logic, Aristotelian and symbolic, philosophy of nature, moral philosophy, metaphysics, contemporary problems and modern philosophy Prerequisites undergraduate major, or equivalent, in scholastic philosophy including history of ancient medieval, and modern philosophy, reading knowledge of Latin, in addition to French and German, GRE, a test in Latin Doctor of Medieval Studies also awarded in this field Administered by the Medieval Institute Faculty 17 full time 20 graduate students enrolled

Physics Nuclear, electron, polymer, and the

oretical physics Prerequisites BS in physics, or its equivalent in courses, GRE, and placement test Faculty 17 full time 34 graduate students enrolled

Political Science Political theory, American government, international relations Combined program with American Studies and Soviet and East European Studies Prerequisites undergraduate major in political science, or 18 semester credits in political science, including American government and political theory, GRE Faculty 8 full time, 4 part time 21 graduate students enrolled

Sociology Criminology, parish sociology Prerequisites undergraduate major in sociology, or in social science with half the course in sociology, GRE Faculty 7 full time, 1 part time 15 graduate students enrolled

Soviet and East European Studies Program Soviet policy, ideology, and background, Soviet Union in international relations, methods of Communist conquest in Eastern and Central Europe, Church and state in Communist countries Prerequisites undergraduate major in political science, Russian or appropriate Eastern European language, in addition to German and/or French, GRE Program organized and controlled by Department of Political Science, with the cooperation of Departments of History, Modern Languages, and Philosophy 6 graduate students enrolled

NOTES

Orientation, meetings, and supervision for assistants and teaching fellows

Occidental College

LOS ANGELES, CALIFORNIA

Intercollegiate Program of Graduate Studies

Occidental College first offered work leading to the M.A. in 1922 In 1951 it began an association with six other colleges in its area—Pomona, Claremont Men's, Scripps, Claremont Graduate School, Redlands, and Whittier This project, subsidized by the Fund for the Advancement of Education and entitled the Intercollegiate Pro

gram of Graduate Studies, was designed to lead to the Ph D in three fields English and Comparative Literature, History and Political Economy This program utilizes faculty and library resources of all seven colleges It is possible to register in any one of the seven, work involves inter subject seminars and colloquia at various institutions and seminars and tutorials at particular colleges, depending upon the student's program

Occidental offers the Ph D in Comparative Literature only Emphasis is on teaching rather than research

Men and women Summer courses First Ph D to be awarded in 1957

Residence requirement for the doctorate 3 years

ADMISSION REQUIREMENTS

Approval by the Department of English and Comparative Literature at Occidental College and by the Educational Council (faculty) of Intercollegiate Program of Graduate Studies Pre requisite the equivalent of an undergraduate major in literature or humanities

Language requirements vary according to the field MAT and qualifying examinations

Recommended ancient and modern languages extensive study of literature criticism related fields

Apply between January 1 and March 15 to Registrar Occidental College

FEES AND FIRST YEAR AID

Tuition—\$600 Room and board—\$340 \$360

Scholarships from \$1 200 to \$2 000 available Apply between January 1 and March 15 to the Registrar, Occidental College

FIELDS OF STUDY FOR THE PH D

Comparative Literature See prerequisites, etc in paragraphs above (under Occidental College) Faculty 5 part time from Occidental, as well as faculty members from six other colleges 16 graduate students enrolled

NOTES

Seminars and teaching internships are offered to increase the effectiveness of the candidate as a college teacher

The Ohio State University

COLUMBUS 10, OHIO

Graduate School

Established in 1911, although graduate instruction had been offered as early as 1894 and on an organized basis since 1902 Administered by a 24 member Graduate Council Master's degree offered in 72 departments, Ph D in 61 of the University's 88 departments in seven colleges, all conferred by the one Graduate school

Master's degree (but not the Ph D) is offered in these departments Dentistry, Journalism, Law, Music, Nursing, Obstetrics and Gynecology, Pediatrics Psychiatry, Public Administration Radiology, Surgery, Welding Engineering

Ohio Agricultural Experiment Station, Wooster, Ohio institutes of child development and family life genetics, geodesy, photogrammetry and cartography, nutrition and food technology and vision Affiliation with Perkins Observatory, Delaware Ohio, Medical Research Center, Graduate Center at Wright Patterson Air Force Base Dayton offering courses leading to science and engineering degrees

State controlled Summer and evening courses 227 Ph D s awarded in 1956 7

Residence requirement for doctorate one full academic year, at least 30 quarter hours must be taken in three consecutive quarters of 10 hours each

Transfer credit permitted only in unusual cases

ADMISSION REQUIREMENTS

Baccalaureate or professional degree from institution of approved standing, in general, 2 7 point hour ratio in all undergraduate work, certified statement of graduation date degree received, and transcript Qualified admission granted by departmental decision

GRE on the recommendation of the University Examiner

Recommended prerequisite training which will facilitate the pursuit of study in the chosen department of specialization

Apply to Office of the Entrance Board, Administration Building at least three weeks before beginning of each quarter

FEES AND FIRST YEAR AID

Tuition—in state \$75 per quarter, out-of-state \$125 per quarter Room—men approximately \$90 per quarter, women approximately \$100 per quarter Board—approximately \$150 per quarter

University fellowships (\$1,500 and \$1,800) require full time graduate work—no outside employment, exemption from all fees, except \$15 matriculation and quarterly \$75 tuition Assistantships (upwards from \$1,200) require work as laboratory or departmental assistant, plus graduate study Some non resident (out of state) tuition scholarships Numerous commercially sponsored competitive fellowships and scholarships File application by February 15 for following academic year

FIELDS OF STUDY FOR THE PH D

Accounting Advanced principles of accounting cost accounting, financial statement analysis economic statistics management accounting auditing principles and procedures, business controls, advance auditing, government accounting Prerequisites undergraduate major in accounting, equivalent of elements of accounting intermediate accounting, advanced principles of accounting, financial statement analysis economic statistics, corporation finance, nine quarter hours of business law, comprehensive test Faculty 15 full time 18 graduate students enrolled

Aeronautical Engineering Aerodynamics, propulsion, structures Prerequisites baccalaureate degree in aeronautical engineering, general examination Faculty 6 full time 22 graduate students enrolled

Agricultural Biochemistry Biological chemistry, nutrition and metabolism, chemistry of foods and food processing, plant chemistry biochemical preparation, enzymes, animal biochemistry, dairy chemistry Combined programs with Institute of Nutrition and Food Technology and other allied departments Prerequisites equivalent to major in chemistry, including year's work in analytical, organic, and physical chemistry, one year of biochemistry and pertinent courses in botany and zoology, test in organic, analytical and physical chemistry after first quarter residence Faculty 11 full time 19 graduate students enrolled

Agricultural Economics and Rural Sociology Farm organization and management, marketing

farm products, rural sociology, farm prices, land use agricultural policy, farm taxation, farm science Prerequisites fundamental courses in economics or sociology, general test Faculty 19 full time 52 graduate students enrolled

Agricultural Education Agricultural education (teaching aids, farming programs, curriculum, adult education FFA, state administration and supervision of vocational agriculture), research Combined program with Colleges of Education and of Agriculture Prerequisites one year of successful experience as teacher of vocational agriculture, general test, three areas of specialization in addition to major in agricultural education (two in education or agriculture) Faculty 6 full time 35 graduate students enrolled

Agromony Soil fertility, soil management, soil chemistry, soil physics, physical chemistry of soils, soil biology, soil genesis and morphology soil conservation, field crop management, seed production field crop ecology, field crop breeding, weed control experimental methods of agronomy Combined programs with Ohio Agricultural Experiment Station laboratory and greenhouse investigations and 13 district and county experiment farms Prerequisites high undergraduate scholarship in mathematics, chemistry, agricultural chemistry, physics, botany, genetics, geology, working knowledge of field crops, general test Faculty 15 full time 23 graduate students enrolled

Anatomy Human anatomy, comparative anatomy, embryology, neurology, histology, histochemistry Prerequisites mastery of preclinical medical sciences ability and experience in individual research, competence in planning and supervising of teaching in the field of anatomy, general test Faculty 12 full time 16 graduate students enrolled

Animal Science Animal nutrition, genetics, production, and meats Prerequisites for animal nutrition—agricultural or biological chemistry, for animal genetics—college zoology, two years study of types and breeding of livestock, collateral work in principles of breeding, feeding, and management, general test Faculty 15 full time 11 graduate students enrolled

Bacteriology Veterinary bacteriology, pathogenic bacteriology dairy bacteriology, pathogenic protozoology, serology, sanitary bacteriology, food microbiology, medical bacteriology, fil

terable viruses, immunology Combined programs with Institute of Nutrition and Food Technology Prerequisites notable ability in bacteriology and allied sciences, aptitude in research, facility in the use of English, comprehensive examination in German or reading knowledge of French and German, preliminary test on fundamentals of bacteriology and allied sciences, test of English may be required Faculty 13 full time 37 graduate students enrolled

Botany and Plant Pathology Physiology morphology, anatomy, pathology, mycology, ecology, genetics, taxonomy Prerequisites general botany general zoology local flora, plant physiology, plant anatomy, ecology, plant pathology organic or biological or agricultural chemistry, general test Faculty 28 full time 1 emeritus 41 graduate students enrolled

Business Organization Cote of courses in administration of business enterprises major functions of business and control, and 24 hours of specialized work. Test general examination Faculty 38 full time, 3 emeriti 82 graduate students enrolled

Ceramic Engineering Ceramic and glass engineering and technology abrasives, electrical and technical ceramics, vitreous enamels structural clay products, refractories whitewares technical design of ceramic equipment Prerequisites baccalaureate degree in ceramic engineering or technology, or courses in qualitative and quantitative chemical analysis, physical chemistry, thermochemical mineralogy, mathematics through calculus, physics (with lab work), general test Faculty 5 full time, 2 emeriti 15 graduate students enrolled

Chemical Engineering Elements of chemical engineering chemical engineering operations, measurements and control, thermodynamics economy, chemical technology, chemical process development, industrial chemistry and chemical engineering petroleum engineering. Prerequisites undergraduate training in chemical engineering, pregeneral test in chemistry, industrial chemistry, and chemical engineering Faculty 11 full time 55 graduate students enrolled

Chemistry Organic, physical, and advanced analytical chemistry, instrumental analysis, inorganic microanalysis, spectroscopic analysis, etc. Prerequisites undergraduate courses in chemistry (general inorganic chemistry, qualitative and quantitative analysis, introductory organic and

physical chemistry, and lab work), for the Ph D, broad general courses, mastery in chosen field as may be expected of professional chemist through courses, literature, and research in physics, mathematics mineralogy, physiological chemistry, bacteriology, German plus one other language, general tests Faculty 29 full time, 3 emeriti 182 graduate students enrolled

Civil Engineering Structural, sanitary and highway engineering, transportation, soil mechanics and foundations Prerequisites baccalaureate degree in some branch of engineering or fundamental engineering sciences (mathematics, mechanics, chemistry), plane surveying theory, field practice, engineering drawing or equivalent general test Faculty 9 full time, 3 emeriti 18 graduate students enrolled

Classical Languages Literary, linguistic, social, historical, economic, or other aspects of ancient civilization Auxiliary fields archaeology, bibliography, ancient history, possibly palaeography, epigraphy or metrics Possible to get combined degree in ancient history and literature Prerequisites B.A. degree, major in classical languages, general test Faculty 4 full time, 1 emeritus 6 graduate students enrolled

Dairy Science Animal nutrition, animal genetics, dairy production Prerequisites courses in biology, physiology, mathematics, agricultural biochemistry, general test Faculty 9 full time 13 graduate students enrolled

Dairy Technology Dairy plant management, market milk, concentrated milk products, ice cream, cheese, technical control of dairy products nutrition and food technology, dairy chemistry, dairy bacteriology, dairy engineering Interdepartmental seminars in cooperation with Institute of Nutrition and Food Technology Prerequisites proper preparation for specialization in this field, general test Faculty 6 full time 8 graduate students enrolled

Economics Economic theory, economic history, labor relations, labor and government, social insurance, money, credit, banking, monetary fiscal policy, public control, economic statistics, econometrics, business fluctuations, national income, accounting, economic systems (planning and reform), welfare economics Prerequisites basic courses in economics plus five of the following accounting, anthropology, business organization, geography history, mathematics, philosophy, political science, psychology, sociology,

broad liberal training acquaintance with European and American history, general test. Faculty 24 full time, 4 emeriti. 40 graduate students enrolled.

Education Educational administration, elementary education, guidance, higher education and teacher training, philosophy and history of education, research, school library science, secondary education (teaching of English, foreign language, mathematics, science, social studies speech), special and adult education, vocational and practical arts education, workshops field experience. Combined programs with Bureau of Educational Research. Prerequisites bachelor's degree and familiarity with areas of education required for certification to teach in Ohio public schools student teaching courses or 1 2 years successful teaching experience general test Faculty 77 full time, 6 emeriti. 383 graduate students enrolled.

Electrical Engineering Electrical machinery, power systems electrical circuits electrical communications and radiation, electrical instruments alternating current apparatus small motors, electronics, electron tubes, servo mechanism, industrial electronics electronic optics betatron studies Prerequisites compliance with Graduate School Handbook regulations for entrance and pursuit of graduate study for degree, general test Faculty 25 full time 77 graduate students enrolled

Engineering Mechanics Advanced experimental methods, advanced dynamics, hydrodynamics and fluid mechanics mechanics of earth action, applied elasticity strength of materials vibrations plasticity plates and shells Prerequisites bachelor's degree in engineering, mathematics, or physics four courses in engineering mechanics, one approved foreign language tested during first year general test. Candidates without engineering degree must take one professional sequence in another department Faculty 8 full time 1 emeritus 12 graduate students enrolled

English Academic (research) or professional study (teaching) Prerequisites undergraduate major in English 30 hours of 3 0 or better, preliminary examination. Faculty 27 full time 4 emeriti. 62 graduate students enrolled

Fine and Applied Arts History of art, painting, sculpture ceramics art education Tests general examination. Faculty 27 full time 16 graduate students enrolled.

Geography Physical geography (geology, climatology, soil sciences, ecology, etc.), cultural geography (social sciences, history, political science, anthropology, sociology) Prerequisites undergraduate major in geography or 40 hours in geography and closely allied fields, training in systematic geomorphology and physiography of US and some other geographical area, knowledge of fundamental concept of economics, dictionary reading knowledge of French and German, general tests Faculty 8 full time, 1 emeritus 8 graduate students enrolled

Geology Stratigraphy (paleontology), stratigraphy (structural geology), geomorphology, glacial geology and quaternary stratigraphy, petrography, mineralogy ore deposits This Department offers courses in geodetic science, geodesy, photogrammetry cooperates with Institute of Geodesy, Photogrammetry and Cartography Prerequisites undergraduate major in geology or 30 hours of geology mineralogy plus chemistry, mathematics, physics biology, field experience, general test Faculty 24 full time, 1 emeritus, 1 research professor 33 graduate students enrolled

German Linguistics or advanced practices Prerequisites wide reading in classical and modern literature, proper preparation for specialized work in German knowledge of Romance language, working knowledge of Latin or Greek, general test Faculty 5 full time, 2 emeriti 10 graduate students enrolled

History Ancient oriental and Greek history, Roman history, the Middle Ages (including English history to 1485) Renaissance and Reformation (1300 1643) European history (1648 1815, 1789 1870 since 1870) the expansion of Europe, history of England (1485 1763, since 1763), the Near East, U S history, constitutional history of England and the U.S., United States foreign relations, Latin America, allied fields anthropology economics, political science philosophy, literature Prerequisites introduction to historical research in American and European history, reading knowledge of French and German, general test Faculty 20 full time, 3 emeriti 37 graduate students enrolled

Home Economics Food and nutrition (dietetics) home economics education. Cooperates with Institute on Child Development and Family Life, Institute of Nutrition and Food Technology Prerequisites undergraduate major in home economics

ics or the like with basic courses in three of the following biological sciences, education, fine arts, physical science, and social sciences, general test Faculty 36 full time 50 graduate students enrolled

Horticulture and Forestry Pomology, vegetable crops, floriculture and ornamental horticulture, horticultural products and processing (canning freezing fermentation dehydration) Prerequisites proper preparation for specialization in this field, acquaintance with important biological principles underlying the production and processing of horticultural crops Recommended plant physiology, biochemistry, plant breeding, plant nutrition botany, genetics statistics soil physics, soil chemistry, physical chemistry spectroscopic chemistry, techniques of research Faculty 14 full time, 1 emeritus 33 graduate students enrolled

Industrial Engineering Methods and standards personnel production engineering safety engineering planning and control plant layout and design system analysis and design, operations research Prerequisites graduation from curriculum in industrial engineering (engineering administration management engineering etc.) or in mechanical engineering accredited by Engineering Council for Professional Development, or qualification for industrial engineering via mathematics physics, chemistry engineering drawing, mechanics, general test Faculty 6 full time 22 graduate students enrolled

Mathematics Prerequisites 45 quarter hours of college mathematics, general test Recommended background in physics, engineering or fields using mathematics Faculty 41 full time 6 emeriti 44 graduate students enrolled

Mechanical Engineering Thermodynamics, heat transfer, fluid mechanics, internal combustion power steam power environmental control machine design Prerequisites baccalaureate degree in mechanical engineering or its equivalent, general test Faculty 14 full time, 2 emeriti 48 graduate students enrolled

Medicine Principles of hematology, minor problems and medical research Prerequisites advanced courses in anatomy, preclinical training in field of problem pursued general test Faculty 11 full time hospital staff part time 4 graduate students enrolled

Metallurgical Engineering Metallurgical, mining and petroleum engineering Prerequisites

chemistry, physics, metallurgy, background courses in metallurgical engineering, etc. must be taken by holders of bachelors' degrees in chemical engineering, chemistry, and physics who wish to pursue work in this field, general test Faculty 9 full time, 2 emeriti 48 graduate students enrolled

Mineralogy Crystallography, thermochemical mineralogy, microscopic mineralogy, petrography Prerequisites fundamental courses in crystallography and mineralogy, quantitative analysis, physical chemistry, general courses in physics, to specialize in petrology, student must have taken physical and historical geology, general test Faculty 2 full time, 1 emeritus 1 graduate student enrolled

Optometry (Physiological Optics) Physiological optics physical optics, anatomy of eye and nervous system, physiology of vision psychology of vision Prerequisites undergraduate work in mathematics through differential and integral calculus, physics zoology, anatomy, physiology, psychology, physiological optics reading knowledge of French and German general test Faculty 5 full time 5 graduate students enrolled

Pathology Pathologic anatomy, clinical pathology Prerequisites for pathologic anatomy—M.D., or enrollment in OSU College of Medicine, thorough training in laboratory work, autopsy technique, surgical pathology, for clinical pathology—B.S. or B.A. with major in chemistry or bacteriology and courses equivalent to fourth year curriculum in medical technology, one year in hospital laboratory, qualification for certification by Board of Medical Technology, general test Faculty 8 full time 8 graduate students enrolled

Pharmacy Pharmaceutical chemistry, pharmacognosy, pharmacology Prerequisites graduation from college of pharmacy which meets accreditation requirements of American Council on Pharmaceutical Education, general test Faculty 9 full time 25 graduate students enrolled

Philosophy History of philosophy, logic, epistemology and metaphysics ethics Prerequisites undergraduate major in philosophy or its equivalent general test Recommended aesthetics philosophy of religion philosophy of science social philosophy Faculty 19 full time, 2 emeriti 12 graduate students enrolled

Physical Education Prerequisites credit in courses in professional education, human anatomy

my and/or physiology, physical and health education to meet requirements set by State of Ohio Department of Education, general test Faculty full time—men s 13, women s 9 46 graduate students enrolled

Physics and Astronomy Classical mechanics electromagnetic theory, quantum and statistical mechanics, modern physics, some field of specialization in physics Prerequisites superior undergraduate record in physics and chemistry, mathematics through differential equations, elementary and intermediate principles of classical and modern physics, for astronomy—astrophysics observational astronomy theoretical and celestial mechanics physical optics and atomic physics, mathematical methods in physics, general oral test Faculty 47 full time 3 emeriti 93 graduate students enrolled

Physiological Chemistry Physiological chemistry, organic chemistry, physical chemistry pharmacology Combined program with Institute of Nutrition and Food Technology Prerequisites laboratory work and fundamental courses in general chemistry, qualitative and quantitative analysis organic chemistry biology, ability to read biochemical papers in French and German, general test Faculty 9 full time 13 graduate students enrolled

Physiology Neuro anatomy and histology, physiological chemistry or biochemistry, advanced physiology laboratory, research Prerequisites organic chemistry, general physics and biological sciences (including comparative anatomy) physical chemistry general test Recommended calculus and statistics Faculty 22 full time, 1 emeritus, 2 research, 21 graduate students enrolled

Political Science Political theory and jurisprudence foreign governments and comparative political institutions American government and politics, state and local government, public opinion parties and pressure groups public administration, public law, international law and relations Prerequisites methods of government research, 35 hours 700 and 800 courses preliminary examination on aptitude for research, broad grasp of information and concepts in political science, acquaintance with relevant aspects of allied disciplines, facility in English expression Faculty 16 full time, 1 emeritus 37 graduate students enrolled.

Poultry Science Poultry genetics, marketing, nutrition, physiology, metabolism, processing marketing, plant management, poultry products technology Prerequisites junior standing, plus 10 hours biological sciences, 20 hours physical and/or social sciences, general test Recommended economics Faculty 6 full time 9 graduate students enrolled

Psychology Clinical or counseling psychology, research and experimental psychology Combined programs with Institute on Child Development and Family Life Prerequisites measurements and statistics, sensory and perceptual processes, learning motivation and performance, personality and social processes, development and differential psychology, problems and techniques of the professional field, three quarter internship or equivalent (for clinical or counseling psychology), preliminary examination on above required courses, general test Faculty 50 full time, 1 emeritus 142 graduate students enrolled

Romance Languages Linguistic or literary Romance languages Prerequisites command of major language, development of history of major language from earliest times history of literature of major language, minor in three fields (Renaissance, Classicism, the Golden Age, 18th century, Romanticism, contemporary literature), and an outstanding author in field not represented in major or minor, general test Recommended French, Italian, Portuguese, Spanish Faculty 19 full time, 2 emeriti 30 graduate students enrolled

Social Administration Community organization, social casework, social group work, corrections, rehabilitation of the handicapped, social work research, public welfare administration. Prerequisites fundamental courses in psychology, economics sociology political science, history, supervised field instruction, general test, field work Recommended Master of Social Work—professional 2 year graduate degree Faculty 19 full time, 3 emeriti 52 graduate students enrolled

Sociology and Anthropology Sociology the early race relations social organization and planning, the family, criminology and penology, educational sociology and ecology, research methodology Anthropology physical anthropology, archaeology, ethnology, social anthropology Prerequisites research methodology or theory, 2 major

and 3 minor areas of sociology, M.A. for Ph.D. candidates, general test Faculty 22 full time, 2 emeriti 45 graduate students enrolled

Speech Rhetoric, public address and discussion, history and theory of the theatre and play production, radio and television programming, speech science, general speech education Combined programs in related fields in psychology, education, physics Prerequisites 40 hours of speech and related field, ability to write and speak with clarity and good usage, general test Faculty 29 full time 63 graduate students enrolled

Veterinary Anatomy Anatomical techniques, veterinary endocrinology, research Prerequisites D.V.M., general test Faculty 1 full time 1 graduate student enrolled

Veterinary Medicine Minor problems, ophthalmology, research Prerequisites D.V.M., general test Faculty 2 full time 3 graduate students enrolled

Veterinary Parasitology Literature, classification, morphology, life histories, and economic importance of parasites Prerequisites D.V.M., general test Faculty 3 full time 2 graduate students enrolled

Veterinary Pathology Pathology technique, advanced systematics pathology, veterinary surgical pathology, animal oncology Prerequisites D.V.M., general test Faculty 2 full time 7 graduate students enrolled

Veterinary Physiology and Pharmacology Research in this field Prerequisites D.V.M., general test Faculty 2 full time 3 graduate students enrolled

Veterinary Preventive Medicine Veterinary preventive medicine, veterinary public health (transmission of diseases from animal to man), improvement of food hygiene Prerequisites D.V.M., general test Faculty 4 full time 1 graduate student enrolled

Veterinary Surgery Surgery, sterility, research Prerequisites D.V.M., general test Faculty 3 full time 1 graduate student enrolled

Zoology and Entomology Animal behavior, ecology, embryology, genetics, invertebrate zoology, ornithology, parasitology, physiological zoology, protozoology, vertebrate zoology, wildlife conservation Combined programs with Ohio Agricultural Experiment Station, Institute of Genetics Prerequisites organic or biological or ag

ricultural chemistry, botany, and three of the following anatomy, or vertebrate zoology, in vertebrate zoology, embryology or plant physiology, genetics, animal physiology or cytology, plant pathology or bacteriology or plant physiology, ecology or animal behavior, Ph.D.'s must have the above, plus physics, statistics, geology, or evolution, general test Faculty 41 full time 63 graduate students enrolled

Oklahoma State University

STILLWATER, OKLAHOMA

Graduate School

Organized in 1929 Graduate courses have been offered since 1910, and the first master's was conferred in 1911 The first Ph.D. was conferred in 1948 The administration of the Graduate School is delegated to the Graduate Council, which has control of all questions pertaining to graduate students This Council is composed of the dean of the Graduate School, the vice chairman of the Graduate Faculty, and two members from each of the five subject matter groups—these ten members are elected by their respective subject matter groups The subject matter groups are I, biological sciences, II, humanities, III, physical sciences and technology, IV, social sciences, V, teacher education

There are residence halls for single students and university-owned apartments for married students

Computer center, radiations and radioisotopes laboratory

Men and women Summer and evening courses 26 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate one year of the last two years must be spent in continuous residence

ADMISSION REQUIREMENTS

Selection is made by the departments based on diagnostic tests or other evaluative instruments, on scholarship, and on adaptability to and qualifications for the particular program Undergraduate degree required.

Dictionary reading knowledge of two modern

foreign languages, or a thorough reading knowledge of one modern foreign language. At the discretion of the student's advisory committee demonstration of competence in a research tool may substitute for one language.

Preliminary examination and qualifying examination

Apply to Dean of the Graduate School

FEES AND FIRST YEAR AID

Tuition—\$7 per semester credit hour (maximum of \$84) for in-state students, \$18 (maximum of \$216) for out-of-state. Room and board for single students—\$264-\$284 per semester.

Teaching and research assistantships with stipends varying from \$1,200 to \$1,800 for 9 months are available. Apply by March 1 to Dean of the Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Agricultural marketing, agricultural production, economics, agricultural policy and prices, applications of econometrics in agricultural economics research. Prerequisites: none specifically, however a student admitted without the equivalent of an undergraduate major in agricultural economics must take some undergraduate courses in agricultural economics and economics on a non-credit basis departmental examinations. Recommended undergraduate course work in agricultural economics, economics, statistics and biological sciences. Faculty 15 full-time 35 graduate students enrolled.

Agronomy Plant breeding and genetics. Prerequisites: one course each in plant breeding, genetics, plant pathology, plant physiology, 13 semester hours in chemistry including biochemistry or organic chemistry, 17 semester hours in 300 and 400 courses in field crops. Recommended: statistics, mathematics, zoology and entomology. Faculty 22 full-time 48 graduate students enrolled.

Animal Husbandry Animal nutrition, animal breeding, and genetics. Combined program with Dairy Husbandry and Poultry Husbandry. Prerequisites: BS in animal sciences (zoology, physiology, animal industry), advisory admission examination in basic animal husbandry. Faculty 12 full-time 29 graduate students enrolled.

Botany Combined program with Departments of Agronomy, Entomology and Zoology. Prerequisites:

basic preparation in general botany, including the fundamental aspects of plant physiology, taxonomy, ecology, morphology, genetics, and cytology, and also in chemistry, zoology, mathematics, statistics and physics, preliminary departmental entrance examination (both written and oral). Recommended: experience in field research. A degree in Plant Ecology is offered by the wild life section of the Zoology Department, one in transmission of plant diseases is granted by the Entomology Department. Faculty 12 full-time 10 graduate students enrolled.

Chemical Engineering Prerequisites: mathematics, physics, chemistry, and fundamentals of chemical engineering. Graduation from a chemical engineering curriculum accredited by the Engineers' Council for Professional Development. Faculty 5 full-time 27 graduate students enrolled.

Chemistry Analytical, biological, organic, and physical chemistry. An Ed.D. with emphasis on chemistry, is jointly administered by the Department of Chemistry and the College of Education. Prerequisites: college-level courses in general, analytical, organic, and physical chemistry, physics and mathematics through calculus, entrance tests in analytical, organic, and physical chemistry. Faculty 21 full-time 72 graduate students enrolled.

Engineering Agricultural, civil, electrical, general industrial engineering and management, mechanical engineering. Prerequisites: undergraduate degree in major selected for graduate study with curriculum accredited by E.C.P.D., departmental examination. Faculty 36 full-time 102 graduate students enrolled.

Entomology Medical and veterinary entomology, insect morphology and physiology, agronomic and horticultural entomology, ecology, and apiculture. Ph.D. degrees are granted in cooperation with the Departments of Veterinary Parasitology and Physiology. Prerequisites: undergraduate major in zoology or entomology, adequate training in other basic sciences, departmental entrance examination, at least one summer of field experience in entomology. Recommended: proficiency with statistics. Program administered by the Departments of Parasitology and Physiology and Zoology. Faculty 5 full-time 13 graduate students enrolled.

Mathematics Algebra, analysis, applied mathematics (high-speed computing techniques and

applications), and topology. An Ed D, with emphasis in mathematics, is jointly administered by the Mathematics Department and the College of Education. Prerequisites: the approximate equivalent of an undergraduate major in mathematics (40 semester hours), including a course in ordinary differential equations and approximately 12 semester hours credit in courses beyond calculus, preliminary examination by the Department Faculty. 12 full time, 27 graduate students enrolled.

Physiology and Pharmacology Endocrinology, reproductive physiology, mammalian physiology. Combined program with entomology. Prerequisites: anatomy, chemistry (inorganic and organic), histology, physics, and physiology, preliminary departmental examination, undergraduate degree in biological science. Faculty: 2 full time, 6 graduate students enrolled.

Veterinary Parasitology General and veterinary parasitology. Combined program is possible with Departments of Physiology and Entomology. Prerequisites: broad background based on courses in most of the following fields: parasitology, zoology, physiology, bacteriology, chemistry, and physics, preliminary examination by department. Recommended courses in statistics and logic, attendance for a summer at a biological station. Faculty: 2 full time, 1 graduate student enrolled.

Zoology Fisheries, biology, upland game, experimental embryology, mammology (bats), or ornithology, ichthyology, limnology, and biological effects of water pollution. Combined program with botany, entomology, and veterinary physiology. Prerequisites: 32 hours of zoology, including comparative anatomy, invertebrate zoology, and genetics, general entrance examination by department Faculty. 10 full time, 23 graduate students enrolled.

NOTES

A program leading to Ed D with major in higher education is offered with a special sequence of 10 semester hours consisting of history and philosophy of higher education (4), organization and administration of higher education (3), and curriculum and methods of higher education (3). Graduate seminars are also offered in higher education. An Ed D with a major in higher education may be earned in any field in which the Ph.D. is offered.

University of Oklahoma

NORMAN, OKLAHOMA

The Graduate College

Established in 1909, the Graduate College is a center of research and creative work, maintaining that atmosphere essential to graduate instruction.

Special library collections in the history of science, Southwest history, and business history. Museum, observatory, computer laboratory, human relations area files, cooperative program with Oak Ridge Institute of Nuclear Science, biological station at Lake Texoma.

Men and women. 34 Ph.D.'s awarded in 1956-7.

Residence requirement for the doctorate of the last sixty hours of study in the doctoral program, at least 30 must be taken in residence at the University.

ADMISSION REQUIREMENTS

Bachelor's degree, 'B' average in all previous work.

Ten credit hours of languages are required on the transcript for full graduate standing.

GRE recommended.

Apply one month prior to start of classes to Office of Admissions and Records.

FEES AND FIRST-YEAR AID

Tuition—In state \$7 per credit hour up to a maximum of \$84, out of state \$18 per credit hour up to a maximum of \$132.

Tuition scholarships and graduate assistantships available. Apply to the Graduate College between September 30 and December 1.

FIELDS OF STUDY FOR THE PH.D.

Biochemistry Prerequisites: 8 hours each of general and organic chemistry, 4 each of physical and quantitative, 8 each of biology and physics. Faculty: 7 full time, 1 graduate student enrolled.

Chemical Engineering Prerequisite: undergraduate degree in chemical engineering. Faculty: 5 full time, 14 graduate students enrolled.

Chemistry Analytical, inorganic, organic, and physical chemistry, biochemistry. Prerequisites: 8-10 hours each of general, organic, analytical,

and physical chemistry, 8 10 of physics, 8 of calculus, reading knowledge of German Qualifying examinations given during first week. Faculty 13 full time, 1 part time 35 graduate students enrolled

Economics Prerequisites undergraduate degree in economics or business, 6 hours of accounting, 3 hours each of business statistics, business law, business management, finance, and marketing Faculty 8 full time, 1 part time 4 graduate students enrolled

Education Elementary, secondary, business and health education, measurement, history and philosophy of education, psychology, guidance Prerequisite undergraduate degree in education Ed.D. also awarded in this field. Faculty 27 full time, 3 part time 147 graduate students enrolled

English Medieval period, 16th century, 17th century, contemporary American literature, linguistics Prerequisites 27 hours of English, including composition, English and American literature, and English language Faculty 15 full time 51 graduate students enrolled

Geology General geology, paleontology, mineralogy, and petrography Prerequisites 30 hours of geology, including physical, historical, and advanced general geology, mineralogy, paleontology, elementary courses in chemistry, physics mechanical drawing, and surveying Faculty 17 full time, 1 part time 84 graduate students enrolled

Government Theory, public law, national government, international government. Prerequisites 9 12 hours of government, 9 16 hours of other social sciences, statistics, college algebra, accounting Faculty 13 full time 12 graduate students enrolled

History American European, general. Prerequisites 20 hours of history Faculty 16 full time, 2 part time 29 graduate students enrolled

Mathematics Prerequisites 12 hours of mathematics. Faculty 14 full time 26 graduate students enrolled

Medical Sciences Anatomy, bacteriology, biochemistry pathology, physiology, pharmacology, preventive medicine, public health. Prerequisites varies with field of concentration, should include biology, chemistry, physics, and courses in special field Faculty 45 full time, 2 part time. 49 graduate students enrolled

Modern Languages French, Spanish. Prerequisites 25 hours in the language, beginning Latin,

European history Faculty 14 full time, 2 part time 3 graduate students enrolled

Physics Molecular spectroscopy, electrical discharges, shock waves, cosmic waves, solid state physics, general physics Prerequisites 30 hours of physics, differential and integral calculus, differential equations, general chemistry Faculty 13 full time. 19 graduate students enrolled

Plant Sciences Taxonomy, morphology, genetics, bacteriology, algology, ecology, physiology Faculty 10 full time, 2 part time 14 graduate students enrolled

Preventive Medicine and Public Health Medical protozoology, medical helminthology, medical entomology, epidemiology, biostatistics, public health Prerequisites 15 hours of biology, 12 of chemistry, 8 of physics Faculty 9 full time 1 graduate student enrolled

Psychology Clinical and experimental theoretical psychology Prerequisites elements of psychology, experimental psychology, statistics, GRE, MAT Faculty 8 full time, 3 part time. 36 graduate students enrolled.

Speech Speech arts, speech sciences. Prerequisites 20 hours of speech, including fundamentals of speech, phonetics and bases of speech behavior Faculty 13 full time

Zoology Comparative physiology, vertebrate physiology, fisheries biology, herpetology, embryology, parasitology, ornithology, limnology, entomology, protozoology, human genetics Prerequisites 24 hours of biology, college algebra, physics organic chemistry Faculty 14 full time, 1 part time 18 graduate students enrolled

Oregon State College

CORVALLIS, OREGON

Oregon State College Graduate School

The Graduate Faculty consists of the President of the College, the academic deans, the chairmen of the several departments in which advanced degrees are offered, and other members who have been elected First M.A. in 1875. From 1910 to 1932, a committee on advanced degrees directed all graduate work. From 1932 to 1946 the Graduate Division administered all graduate work at both the University of Oregon

and Oregon State College, with individual graduate councils at both institutions. In 1946, the Graduate Division was dissolved and separate Graduate Schools established at the two institutions. Control of graduate policies continued under the Oregon State College Graduate Council.

Horner Museum, Braly egg collection, cyclotron, electron microscope, digital computer, KOAC radio and television stations, Forest Products Laboratory, McDonald experimental forest, arboretum, seed laboratory pilot food processing plant experimental farms.

Summer courses available 31 Ph.D.s awarded in 1956-7.

Residence requirements for the doctorate: one year must be spent in continuous residence at Oregon State College, 45 hours of course work in residence, three years of graduate work beyond bachelor's degree before Ph.D. can be awarded.

Transfer students must have honorable dismissal.

ADMISSION REQUIREMENTS

Applicants must have a baccalaureate degree, GPA of 2.5 and an undergraduate major equivalent to that required at Oregon State College. German and French are required, although there may be another language substituted for French.

Qualifying examinations must be taken upon entrance to determine weaknesses; an oral preliminary examination is required for advancement and a final oral on the dissertation. Course requirements in the major subject and each of the two minors are set up to meet individual requirements.

Apply at any time to Registrar's Office.

FEES AND FIRST YEAR AID

Tuition—\$71 per quarter.

Various graduate assistantships, fellowships, research assistantships, and a few scholarships available. Apply to departments and Registrar's office at any time.

FIELDS OF STUDY FOR THE PH.D.

In about 70 fields of study in the 26 departments listed below. The candidates for admission must have the equivalent of a baccalaureate major in the field, and a minimum of a 2.5 GPA, with A equaling 4. A major and two

minors are required in the Ph.D. program, with one minor being in an outside field.

Agricultural Economics Agricultural marketing, policy, finance, and prices, land and production economics, farm management. Faculty 12 full time 6 Ph.D. students enrolled.

Animal Husbandry Nutrition, reproductive physiology, physiology, wool technology. Faculty 14 full time 2 Ph.D. students enrolled.

Bacteriology Dairy, food, industrial, pathogenic and soil bacteriology, hygiene and sanitation, physiology of bacteria, virology and bacteriology of water and sewage. Faculty 7 full time 6 Ph.D. students enrolled.

Botany Cytology, ecology, morphology, mycology, plant pathology, plant physiology, and systematic botany. Faculty 15 full time 23 Ph.D. students enrolled.

Chemical Engineering Opportunity for supplemental work in many specialized fields. Faculty 4 full time, 1 part time. 5 Ph.D. students enrolled.

Chemistry Analytical, forest products, inorganic, organic, and physical chemistry, biochemistry (including agricultural chemistry), radiochemistry (organic and inorganic), and their various ramifications. Faculty 29 full time 36 Ph.D. students enrolled.

Civil Engineering Highway, hydraulic, sanitary, structural engineering. Faculty 10 full time 1 Ph.D. student enrolled.

Dairying Production, technology, and management. Faculty 6 full time 1 Ph.D. student enrolled.

Electrical Engineering Power, communication, servomechanisms, electronic engineering, and illumination. Faculty 9 full time 1 Ph.D. student enrolled.

Entomology General, applied forest, and systematic entomology, insect toxicology. Faculty 13 full time 11 Ph.D. students enrolled.

Family Life and Home Administration Child development and family relationships. Faculty 8 full time 1 Ph.D. student enrolled.

Farm Crops Plant breeding, weed control, cultural methods and production, seed technology. Faculty 7 full time 3 Ph.D. students enrolled.

Fish and Game Management Wildlife management and fisheries. Faculty 8 full time 3 Ph.D. students enrolled.

Food Technology Food processing, including

preservation by canning, freezing, dehydration, fermentation, irradiation, salting, or by sugar and chemicals, quality evaluation of products with respect to color, flavor, texture, etc Faculty 10 full time 5 Ph.D. students enrolled

Foods and Nutrition Faculty 8 full time 1 Ph.D. student enrolled

General Science Ph.D. offers a broad program for teachers in small liberal arts colleges who do not desire or need the highly specialized training of a departmental degree. A minimum of 25 hours in each of three science fields is required. A fourth field including the college teaching minor, is required. The thesis research may be in a field of science or in the teaching of a science in college. Prerequisites: a baccalaureate degree with three fields of science and college teaching experience. Faculty 5 full time

Genetics Opportunity is given the student to specialize in both pure and applied genetics through a program integrated through the staff of the School of Science and Agriculture. Program is designed to acquaint the student with all the principal phases of genetics and at the same time permit him to emphasize his research in interests in his field. Faculty 17 full time 8 Ph.D. students enrolled

Geology Economic geology, geomorphology, invertebrate paleontology, micropaleontology, and stratigraphy. Faculty 6 full time

Horticulture Pomology, vegetable crops, and ornamental horticulture. Faculty 8 full time 1 Ph.D. student enrolled

Mathematics Analysis and applied mathematics, with emphasis on numerical analysis. Faculty 15 full time 13 Ph.D. students enrolled

Mechanical Engineering Aeronautics, applied mechanics materials, design, heat, and power. Faculty 10 full time 2 Ph.D. students enrolled

Pharmacy Pharmaceutical analysis, pharmacology, and pharmacognosy. Faculty 6 full time 1 Ph.D. student enrolled

Physics May include research and thesis in any of the classical branches, modern physics electronics, nuclear physics, meteorology, photography, theoretical physics, and applied physics. Faculty 11 full time 11 Ph.D. students enrolled

Poultry Husbandry Nutrition, breeding reproduction physiology, and management. Faculty 4 full time

Soils May include research and study in soil fertility, physics, chemistry, genesis, irrigation, or

forest soils. Faculty 10 full time 7 Ph.D. students enrolled

Zoology Cellular biology, embryology and anatomy, genetics invertebrate zoology and parasitology, natural history and ecology, and physiology. Faculty 10 full time 11 Ph.D. students enrolled

University of Oregon

EUGENE, OREGON

Graduate School

The University was organized in 1876, the Ph.D. offered for the first time in 1920

Men and women accepted. Summer courses available. 30 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate: three years of graduate study, one year must be spent on the University campus

ADMISSION REQUIREMENTS

Baccalaureate degree and a record suggesting aptitude and ability for graduate work. There are no set admission requirements

GRE, MAT required by some departments
Apply at any time to the Admissions Office

FEES AND FIRST YEAR AID

Tuition—\$71 per term. Room rental—\$57 to \$112.50 per term. Board—\$48 per month

Teaching assistantships at \$1,100 to \$1,800 per year. Apply before March 15 to the Graduate School

FIELDS OF STUDY FOR THE PH.D.

Anthropology Archaeology, cultural anthropology, ethnology, linguistics, physical anthropology. Faculty 4 full time 9 graduate students enrolled

Biology Cryptogamic botany, cytology, ecology, genetics, invertebrate zoology, parasitology, cellular physiology, mammalian physiology, systematic botany, vertebrate zoology. Faculty 14 full time 19 graduate students enrolled

Chemistry Inorganic, organic, physical, biochemistry. Faculty 9 full time 28 graduate students enrolled

Economics Economic theory, history of economic thought, monetary and banking theory, international economics, public finance and fiscal policy, labor economics, national income analy-

sis Faculty 8 full time. 19 graduate students enrolled

Education School administration, curriculum special education, guidance and counseling Faculty 16 full time 10 part time 69 graduate students enrolled.

English English literature, American literature Faculty 25 full time 20 graduate students enrolled.

History Far Western United States, Pacific Northwest, American foreign relations since 1914, 20th century, Western Europe, medieval and Renaissance Europe, Northern Britain Faculty 12 full time 30 graduate students enrolled

Geology Petrology mineralogy economic geology, paleontology Faculty 4 full time 10 graduate students enrolled

Mathematics Algebra analysis, statistics Faculty 10 full time 27 graduate students enrolled

Medical Science Faculty 50 full time, 50 part time 6 graduate students enrolled

Physical Education Administration child growth and development, corrective physical education Faculty 14 full time 37 graduate students enrolled.

Physics Spectroscopy, solid state physics nuclear physics, theoretical physics Faculty 9 full time 22 graduate students enrolled

Political Science Political theory, political institutions and behavior, public law and policy Faculty 9 full time 19 graduate students enrolled

Psychology Experimental, clinical, counseling personality social Faculty 12 full time 50 graduate students enrolled

Romance Languages French, Spanish, and Romance languages. Faculty 7 full time 20 graduate students enrolled

Sociology Faculty 6 full time 13 graduate students enrolled

The Pennsylvania State University

UNIVERSITY PARK, PENNSYLVANIA

The Graduate School

Graduate instruction was first offered in 1862 and for many years was carried on under the direction of a committee of the University Sen

ate In 1922 the Graduate School was organized, and in 1924 the granting of the Ph.D. was authorized

The post office address of the University is University Park, Pa., but the town in which the University is located is State College, Pa., and is so listed in airline, bus, and train schedules

Ph.D. is offered in 66 areas of specialization, in 21 of which the Ed.D. is also awarded.

Located on the campus are a number of research facilities These include agricultural experiment station, United States Regional Pasture Research Laboratory, animal calorimeter, climatology, cryogenic laboratory, X ray and crystal analysis laboratory, ordinance research laboratory and water tunnel for naval ordinance and fundamental hydraulics research, nuclear reactor, ionosphere research laboratory digital computer, petroleum research laboratory, mineral industries experiment station, speech and hearing clinic, psychology clinic, home economics research laboratories, instructional research program investigating instructional film research and closed circuit television teaching, bureau of business research.

Men and women Summer and evening courses in some fields 101 Ph.D.'s awarded in 1956-7

Residence requirements for doctorate 30 credits in residence at the University in regular semesters, during at least 2 semesters, if he be a part time student, candidate must limit work load to half time, and devote balance to graduate program. Minimum equivalent of three academic years of graduate work required

Maximum of two full academic years of residence in another institution can be transferred in partial fulfillment of doctorate. It is rarely possible to finish doctorate in one additional year at the University

ADMISSION REQUIREMENTS

Bachelor's degree. Junior senior GPA of 2.5 or better Certain departments may require higher average. Minimum amount of course work varies with departments Conditional admission to some departments with GPA below 2.5, if other qualifications suggest probable success in graduate school and department recommends admission Such student must be re-evaluated at end of first semester

GRE or MAT required in some departments

FEEES AND FIRST YEAR AID

Tuition—in state \$175 per semester, out-of-state \$375 Tuition for out-of state students doing off campus research—\$175

Assistantships, stipend scholarships, and tuition scholarships Apply to Department for first two and to the Graduate School for the last Holders of scholarships may not work for pay and must carry full academic load. Dormitory counselorships for men apply to Dean of Men

FIELDS OF STUDY FOR THE PH D

Aeronautical Engineering Aerodynamics structures, aeroelasticity, turbomachinery, and dynamics Prerequisites BS in engineering, mathematics, or physics undergraduate courses in statics, dynamics, strength of materials, and mathematics through differential equations (preferably through vector analysis) Faculty 3 staff members 6 graduate students enrolled

Agricultural and Biological Chemistry Plant metabolism and photosynthesis intermediary metabolism, nucleic acids, proteins carbohydrates, lipids enzymes, vitamins, animal nutrition, poultry nutrition, clinical chemistry endocrinology, and pesticides Prerequisites courses in mathematics, physics, biological sciences, inorganic, analytical, organic, and physical chemistry equivalent to those in undergraduate curriculum in the first 3 years of the agricultural and biological chemistry curriculum Faculty 12 staff members 26 graduate students enrolled

Agricultural Economics Prerequisites 3 credits in agricultural economics, 3 in economics, and 3 additional in either Faculty 10 staff members 26 graduate students enrolled

Agricultural Education Prerequisites 21 semester hours in professional education courses, including educational psychology and practice teaching in vocational agriculture, or certification to teach it Ed.D also awarded in this field Faculty 3 staff members 21 graduate students enrolled

Agronomy Soil chemistry, soil conservation, soil classification soil fertility soil mineralogy soil physics the breeding of corn, small grains and forage plants, forage management, turf management, potato culture, tobacco culture, weed control, and ecology of crops and pastures. Prerequisites vary with field of concentration, but basic courses in chemistry, mathematics

physics, and biological sciences are required Faculty 18 staff members 23 graduate students enrolled

Animal Husbandry Animal production, animal breeding, meats Prerequisite completion of an undergraduate curriculum substantially equivalent to that recommended for pre graduate training in the animal husbandry curriculum at this University Faculty 2 staff members 6 graduate students enrolled

Animal Nutrition Energy metabolism Prerequisites animal nutrition courses 401 and 402, or their equivalent, and requirements for graduate work in agricultural and biological chemistry Faculty 4 staff members

Art Education Prerequisites two years of successful teaching experience, equivalent of an approved four year art education curriculum. Ed.D also awarded in this field Faculty 4 staff members 20 graduate students enrolled

Bacteriology Bacterial physiology soil microbiology, food and industrial microbiology, immunology, and virology Opportunities for research in animal disease in cooperation with Department of Veterinary Science Prerequisites 20 semester hours of chemistry, including quantitative analysis and organic chemistry, and 20 of biological science, including 8 of microbiology (additional chemistry can be substituted for part of the biology) Faculty 7 staff members 23 graduate students enrolled

Botany Plant anatomy, cytology, ecology, genetics, morphology mycology, physiology, and taxonomy Prerequisites 27 credits in botany, or 21 in botany and 6 in biological science A maximum of 6 credits may be made up after admission Faculty 19 staff members 22 graduate students enrolled

Business Administration Accounting, banking and finance, insurance and real estate, management, marketing, trade and transportation. Prerequisites minimum of 18 credits in field of accounting, commerce, economics, and business statistics, including at least 6 in economics and 3 in business statistics Faculty 28 staff members 33 graduate students enrolled

Business Education (See Education.)
Ceramic Technology Physical ceramics, chemical ceramics, glass technology Prerequisites bachelor's degree in ceramics, or a related physical science, knowledge of integral and differential calculus, adequate physics and chemistry

Faculty 7 staff members 10 graduate students enrolled

Chemical Engineering Prerequisites 24 semester hours of chemistry including stoichiometry industrial chemistry unit operations thermodynamics plant design kinetics or chemical engineering problems 14 semester hours of engineering including engineering mechanics electrical engineering or mechanical engineering basic courses chemistry through one year of physical chemistry, mathematics through differential equations Faculty 6 staff members 18 graduate students enrolled

Chemistry Analytical inorganic organic physical and petroleum chemistry Prerequisites one year's work in each of the following—general analytical organic and physical chemistry general physics mathematics through integral calculus Recommended reading knowledge of at least one foreign language German preferred Faculty 32 staff members 127 graduate students enrolled

Child Development and Family Relationships Guidance and development of children relationships among various members of the family problems of all stages of the family cycle nursery school education education for home and family living in the schools parental education and work with children and families in community agencies Ed D also awarded in this field Prerequisites at least 6 credits in the physical and biological sciences 12 in the social sciences (including basic courses in sociology and psychology) 6 in child development and family relationships Faculty 4 staff members 11 graduate students enrolled

Civil Engineering Structures hydraulics transportation engineering surveying and sanitary engineering Courses may be taken in other departments Faculty 8 staff members 8 graduate students enrolled

Clinical Speech Admission to master's program requires 27 hours in clinical speech and hearing education and psychology courses including at least 9 in speech correction and/or audiology Ed D also given in this field Faculty 5 staff members 24 graduate students enrolled

Clothing and Textiles Work can be taken with major emphasis on the textile side (stressing the background natural sciences) or on the clothing side (stressing the background social sciences) Ed D also given in this field Cand

dates are accepted who have a strong background and a good record in home economics chemistry sociology economics or psychology Faculty 3 staff members 16 graduate students enrolled

Comparative Literature Courses in various language and literature departments—ancient and modern as well as in comparative literature Students should have more than a minimum knowledge of foreign languages Faculty 14 staff members

Dairy Science Dairy products manufacture chemistry of milk and dairy products dairy cattle nutrition dairy cattle management and physiology of reproduction Minor generally taken in agricultural and biological chemistry bacteriology zoology or agricultural economics Prerequisites undergraduate curriculum in dairy science or related field including algebra and general physics Faculty 9 staff members 17 graduate students enrolled

Economics Economic theory labor international economics government economic policy money credit and public finance Prerequisites 6 credits in economic principles 3 in statistics or advanced mathematics 9 in social sciences Faculty 11 staff members 6 graduate students enrolled

Education Business elementary and secondary education educational administration guidance and clinical speech Ed D also awarded in these areas and in higher education Faculty 41 staff members 296 graduate students enrolled exclusive of 400 taking extension work

Electrical Engineering Information theory microwave theory and techniques networks computers (including digital analog, and network analyzer) control power conversion servomechanisms tubes and transistors dynamical machine analysis power dispatching relay protection and wave propagation Prerequisites BS degree in engineering or science courses in electrical circuits machinery and electronics Faculty 16 staff members 39 graduate students enrolled

Engineering Mechanics Dynamics and vibrations theory of elasticity and strength of materials experimental stress analysis, theory of plasticity and mechanical properties of materials, fluid mechanics option Prerequisites undergraduate degree in engineering or some field of science courses in statistics dynamics strength of materials and materials of engineering Faculty

ty 7 staff members 27 graduate students enrolled

English English literature, American literature, philology, or rhetoric Prerequisite 18 credits in English (24 preferred), exclusive of survey and freshman courses Faculty 20 staff members 30 graduate students enrolled

Fuel Technology Chemistry and combustion of solid, liquid, and gaseous fuels Prerequisite bachelor's degree, with training in one of the following fields—chemistry, chemical engineering, physics, or fuel technology Faculty 5 staff members 28 graduate students enrolled

General Home Economics Course for teachers in secondary schools or small colleges and others who want proficiency in several areas of home economics Ed D also awarded in this field 5 graduate students enrolled

Geography Cartography, physical, human, political, economic, or regional geography Prerequisites Option 1—18 undergraduate credits in geography, 20 in mathematics and biological or physical sciences including at least 6 credits in geology. Option 2—18 credits in geography, plus 20 credits in the social sciences, including at least 3 in economics Ed D also given in this field Faculty 4 staff members 14 graduate students enrolled

Geology Stratigraphy, paleontology, paleobotany, palynology, regional and structural geology, geomorphology, coal geology, and metalliferous geology Prerequisites bachelor's degree, with 25 semester hours in an approved combination of chemistry, physics, mathematics, and biological sciences, at least 18 hours in geology and mineralogy Faculty 5 staff members 28 graduate students enrolled

Geophysics and Geochemistry Geophysical prospecting, seismology, gravity, well logging radioactive age determinations, tectonics, crystal chemistry, phase equilibria, element distribution and affiliations, isotope geochemistry, geochemical prospecting, cosmochemistry, high temperature and high pressure geochemistry Prerequisites for geophysics—10 semester hours of geology and mineralogy, 20 of physics and chemistry mathematics through differential equations, for geochemistry—10 semester hours of geology and mineralogy, 24 of chemistry and physics—mathematics through integral calculus Faculty 6 staff members 27 graduate students enrolled

German Prerequisite 18 undergraduate credits

in German Faculty 5 staff members 6 graduate students enrolled.

Guidance (See Education)

Higher Education (See Education)

History Medieval, early modern European, modern European, colonial American, 19th century American, modern American, and Latin American history Prerequisites undergraduate course work covering history of Europe from ancient times to the present, and the history of America from its discovery to the present Ed D also awarded in this field Faculty 17 staff members 30 graduate students enrolled

Home Economics Education Curriculum development, evaluation, teaching at the elementary, secondary, adult, or higher educational levels, supervision, administration in colleges, research Prerequisites 51 undergraduate credits in home economics education, education and/or psychology, aspects of home economics, the physical and biological sciences, and the social sciences Ed D also awarded in this field Faculty 4 staff members 12 graduate students enrolled

Home Management and Family Economics Family management practices, their effects upon members of the family unit, and the interaction of such practices with the local and national economy Ed D also awarded in this field Faculty 7 staff members 11 graduate students enrolled.

Horticulture Propagation, production, processing, breeding, nutrition, and other physiological studies of horticultural crop species, landscape design. Prerequisite completion of undergraduate curriculum substantially equivalent to one in horticulture at this University Faculty 12 staff members 7 graduate students enrolled

Industrial Education Industrial arts education, vocational industrial education Prerequisite graduation from an approved curriculum in the field Ed D also awarded in this field Faculty 3 staff members 7 graduate students enrolled

Mathematics Function theory, abstract algebra, topology, number theory, statistics, numerical analysis, and mathematical logic. Prerequisite credit for at least two advanced courses beyond integral calculus Faculty 16 staff members 34 graduate students enrolled

Mechanical Engineering Heat power, machine design Prerequisite background equivalent to

graduates in mechanical engineering at this University Faculty 7 staff members 19 graduate students enrolled

Metallurgy Chemical, physical, and mechanical metallurgy Prerequisites BS in metallurgy, metallurgical engineering, chemistry, chemical engineering physics mechanical engineering, or engineering mechanics, or a satisfactory bachelors degree in another field, provided it has included the equivalents of mathematics through integral calculus 8 credits of physics, 12 of chemistry, 10 of other scientific, engineering, or mineral science fields, and 10 of metallurgy Faculty 6 staff members 16 graduate students enrolled

Meteorology Aerosol and cloud physics, dynamic meteorology, including turbulence and atmospheric circulation, atmospheric optics macro and micro climatology agricultural meteorology, synoptic meteorology, or meteorological instrumentation Prerequisites mathematics through differential equations, one year of college physics, 12 credits in meteorology Faculty 5 staff members 16 graduate students enrolled

Mineral Economics Economics of exploration for, and the extraction, beneficiation and utilization of, the ferrous and nonferrous metals, the nonmetallics the fuels, and ground water Work also offered in property evaluation, analysis of mineral data and influence of technological advances on mineral economics Prerequisites 24 credits in chemistry, physics and mathematics, 12 in geology mineralogy, and/or the biological sciences 9 in mineral economics economics commerce, and/or geography, 6 in mining metallurgy, petroleum engineering, ceramics and/or in industrial engineering Up to 9 hours of deficiencies can be made up in graduate school Faculty 2 staff members 6 graduate students enrolled

Mineral Preparation Fundamentals of gravity, electrical, and chemical methods of beneficiating natural mineral deposits, properties of specific minerals as they are related to beneficiation Eligible for admission—persons with a BS in chemistry, physics, and mathematics and in such engineering fields as mining, metallurgy ceramics, fuel technology, and mechanical, electrical, and civil However, graduates in these above fields must take 6 credits of undergraduate courses in mineral preparation Faculty 2 staff members 7 graduate students enrolled

Mineralogy Igneous, sedimentary, and meta-

morphic petrology, mineralogy, crystal chemistry, X ray, clay and ore mineralogy, applications of statistics in the earth sciences Prerequisites mathematics through integral calculus, chemistry through quantitative analysis, 10 credits of general physics, 30 of geology, petrology, and mineralogy, including microscopical petrography Other prerequisites, depending upon field of specialization Faculty 7 staff members 20 graduate students enrolled

Mining Engineering Underground stress analysis, drilling and blasting mined materials handling, electric power for mines mathematical analysis of mine layouts ventilation network studies, mine operations programming mine safety trends dust control, roof support methods, continuous mining mine illumination, mine production and cost control, mine property valuation Prerequisite at least a BS in mining or related engineering field Faculty 3 staff members 4 graduate students enrolled

Music Education (Ed D only) Professional training in vocal, instrumental, or theoretical music for teaching on the elementary, secondary, or college level Prerequisite graduation from a recognized music education curriculum The student must obtain a masters degree as he works toward a doctorate Faculty 5 staff members 8 graduate students enrolled

Nutrition Prerequisites at least 18 semester hours in the physical and biological sciences, 9 in the social sciences, 10 in foods and nutrition. Faculty 9 staff members 17 graduate students enrolled

Petroleum and Natural Gas Engineering Experimental and theoretical studies of water flooding and the newer methods of displacing oil from porous media methods for calculating reservoir performance scaled laboratory studies of reservoir phenomena, and drilling and well completion problems Students with degrees in other curricula should have 20 credits of chemistry and physics 6 of geology, 15 of engineering science, mathematics through integral calculus Faculty 6 staff members 7 graduate students enrolled

Physical Education History, philosophy, principles, applied science (physiology of exercise, kinesiology, body mechanics), organization and administration, objectives, methods, and evaluation, adaptives and correctives, health, and in intramural and interschool athletics Prerequisites 36 semester hours in professional health and

physical education, half of which may be met by work in biological and physical sciences, and 18 hours in education and psychology Ed D also awarded in this field Faculty 13 staff members 33 graduate students enrolled

Physics Visible and infrared spectroscopy, crystal structure, solid state, field emission acoustics, high pressure physics, biophysics, electronics, shock waves, low temperature physics, nuclear physics, physics of high polymers theoretical physics Prerequisites bachelors in physics or an allied field Faculty 27 staff members 77 graduate students enrolled

Plant Pathology Plant diseases and control Prerequisites 27 credits in botany plant pathology, and biological science of which not more than 6 may be in biological science Faculty 11 staff members 1 graduate student enrolled

Political Science American government political theory, international relations, or comparative government Prerequisite 12 to 15 hours of undergraduate work in this field Faculty 10 staff members 12 graduate students enrolled

Poultry Husbandry Poultry nutrition management, products, breeding animal behavior Joint major with other basic science departments Prerequisite undergraduate major in a basic science Faculty 9 staff members 3 graduate students enrolled

Psychology Clinical, educational and developmental, experimental and general school, industrial and business, and social psychology, psychological measurements and statistics Prerequisites broad undergraduate training, upper division GPA of B or above, at least 12 credits in psychology, satisfactory rating on scholastic aptitude examination. Ed D also awarded in this field Faculty 26 staff members 103 graduate students enrolled

Recreation Education History philosophy and principles, administration and supervision planning areas and facilities, program content and application, surveys and appraisals, principles of the group process, research Prerequisites undergraduate major in recreation desirable but major in sociology music, physical education, fine or industrial arts theatre arts, or related fields may be accepted Ed D also awarded in this field Faculty 6 staff members 3 graduate students enrolled

Romance Languages and Literatures Prerequisite 24 credits of the undergraduate major program

at this University, or equivalent Faculty 11 staff members 12 graduate students enrolled

Rural Sociology Prerequisites 3 credits in rural sociology, 3 in sociology, 3 additional credits in either field Faculty 8 staff members 18 graduate students enrolled

Sociology Minor may be taken in anthropology Prerequisites undergraduate preparation, including 12 hours in sociology and at least 7 in other social sciences (a broad background in the arts and sciences preferred) Faculty 10 staff members 13 graduate students enrolled

Speech Speech arts (interpretation, drama, theatre), radio and television, rhetoric and public address speech science, or speech pathology and audiology Prerequisite 12 credits in speech—see catalog. Ed D also awarded in this field Faculty 12 staff members 19 graduate students enrolled

NOTES

A number of courses offered to prepare students for college teaching Many graduate assistantships after the first year are teaching assistantships under various amounts of supervision, depending upon the department

After a year of outstanding graduate work, many departments are able to award fellowships to certain students The Graduate School, itself, has ten fellowships to award, especially in the humanities and social sciences Fellows receive a stipend which varies with the award, are exempt from all major fees, and must carry a full program of graduate work

In 22 other areas the master's degree is offered, but not the doctorate

University of Pennsylvania

PHILADELPHIA 4, PENNSYLVANIA

Graduate School of Arts and Sciences

Established in 1882 Ph D was first conferred in 1889 Graduate instruction in certain engineering and medical departments is given under the administration of the Graduate School by the faculties of the Schools of Engineering and Medicine. Governed by the Dean and the Council representing its four divisions

Allied divisions offering doctoral degrees are School of Education, Ed D, School of Social Work, DSW, Medical School, MD, Graduate Medicine, MSD, Dental School DDS, Veterinary School, VMD, Law School, SJD

University library includes libraries of medieval history, Shakespeareana and Franklin imprints Also departmental libraries Museum containing archaeological and ethnological collections from all continents Foundations for insurance education and child development Institutes of local and state government and of foreign policy South Asia Regional Studies Program Center for human relations Arboretum Observatories, Univac Dormitories for graduate students

Men and women Summer and evening courses 113 Ph D's awarded in 1956-7

Residence requirements for doctorate twelve semester credits taken within one academic year—September to June, possession of a master's degree from this University

Credit for graduate work completed elsewhere allowed only after student has completed an adequate amount of graduate study at this University

ADMISSION REQUIREMENTS

Students are admitted by the Dean of the School upon the advice of various departments An undergraduate degree is required together with a transcript of the college or other graduate school record, and three letters of recommendation

Apply to the Dean of the Graduate School prior to January 1, June 1, or September 1 for succeeding terms

FEES AND FIRST YEAR AID

Tuition—\$800 per year Room—men and women \$300 Board—\$600

Fellowships, scholarships and loan funds Employment opportunities Apply to Graduate School before February 18

FIELDS OF STUDY FOR THE PH D

American Civilization American history, literature, arts social institutions Prerequisites evidence of proficiency in American history and literature, French and German, usually GRE Recommended large number of courses in related fields Faculty 2 full time, 9 part time 67 graduate students enrolled

Anatomy All branches of anatomy and related sciences Prerequisites BA or BS, all candidates for admission must be passed on personally by faculty as to qualifications 2 graduate students enrolled

Anthropology Physical anthropology archaeology, cultural and social anthropology Prerequisites French and German, MA thesis Faculty 3 full time, 7 part time 34 graduate students enrolled

Archaeology Curriculum under discussion Faculty 9 full time

Astronomy Eclipsing variable stars photoelectric photometry, electronic instrumentation, stellar scintillation Prerequisites bachelor's degree, with major in astronomy or related subjects Recommended some knowledge of electronics Faculty 4 full time 3 graduate students enrolled

Biochemistry Intermediary metabolism of carbohydrates proteins, and lipids, mechanism of enzyme action action of hormones, muscle contraction and bioelectric phenomena, mucopolysaccharides, biosynthesis of nucleic acids, biochemistry of viruses chemistry and metabolism of intracellular pigments Graduate course in biochemistry as offered to Ph D candidates majoring in other fields Prerequisites for candidacy completion of recommended graduate courses a written qualifying examination covering biochemistry organic and physical chemistry and material in any biological science selected by the candidate, general chemistry and qualitative analysis 11 and 12 and a term of general physical chemistry Recommended steroid chemistry 9 graduate students enrolled

Biophysics Electron transport and phosphorylation in respiratory and photosynthetic processes mechanism of enzyme action virology, electron microscopy Combined program with Inter-science and Biochemistry Departments Prerequisites strong background in physics, chemistry, or biology, interview, recommendations Faculty 4 full time 3 graduate students enrolled

Botany Plant physiology, experimental morphology Combined programs with general physiology microbiology, biochemistry Prerequisites for degree normally an undergraduate degree in a biological science, with approximately a B average, organic chemistry, a year of physics and mathematics (deficiencies in a particular area may be made up in the first year of graduate work if the academic record is good), two of the

following—French, German, Russian, a thesis, advanced training in physiology, genetics, morphology, taxonomy, biochemistry, biometry, at least two of four graduate courses offered by the Department Recommended at least one year of teaching experience in the Department Faculty 6 full time, 2 part time 3 graduate students enrolled

Chemical Engineering Reaction kinetics mass transfer, transport of solids Prerequisites for degree BS in Ch E., plus 24 semester credits of graduate work for the Ph D., thesis plus 30 semester credits beyond the MS Recommended chemistry, mathematics, physics Faculty 3 full time, 2 part time 9 graduate students enrolled

Chemistry Organic physical, biophysical, analytical inorganic, electrochemistry Combined program with biochemistry Prerequisites inorganic, qualitative, quantitative, organic, and physical chemistry, differential and integral calculus 1 year course in physics, registration examination Faculty 17 full time, 3 part time 138 graduate students enrolled

City Planning and Regional Science City planning theory, urban growth and structure, transportation and land use, regional development patterns regional science All Ph D. candidates in this field are required to have a master's degree in some other discipline Prerequisites MA in one of the social sciences or M.C.P., evidence of ability to engage in creative research Recommended mathematics through calculus, statistics, some course work in at least three of the social sciences and in city planning Faculty 4 full time 9 graduate students enrolled

Civil Engineering General civil engineering and engineering mechanics Prerequisites BS in engineering and approval by group committee of undergraduate record Program administered by School of Civil Engineering and Graduate School Faculty 4 full time, 2 part time 50 graduate students enrolled

Classical Archaeology Prerequisites Greek, classical history (or equivalent), and at least 12 semester credits of other work in classical studies Recommended Greek, Latin, German, French, Italian, modern Greek, history of art, ancient history, including Near East and Egypt, geology 3 graduate students enrolled

Classical Studies Latin, Greek, classical studies classical linguistics Combined programs in

classical archaeology, linguistics, history, and philosophy Prerequisites in Latin—4 high school units and 4 years in college, in Greek—4 years in college, French and German (standard), for those in Latin 2 years of Greek, for those in Greek, 2 years of Latin Recommended classical archaeology, history, art, philosophy Faculty 5 full time 15 graduate students enrolled

Economic History An integrated program which combines history with economic theory and permits specialization according to student interests Joint program of the Departments of History and Economics administered by an interdepartmental committee Prerequisites AB, or equivalent, with an average grade of 'B', GRE in borderline cases Faculty 10 full time, 1 part time 3 graduate students enrolled

Economics Economic theory, economic statistics, finance, marketing, insurance, transportation and public utilities, international commerce, business organization and operation, labor and industrial relations, economic geography Combined programs with history with the degree in economic history, with South Asia studies with the Ph D. in economics Prerequisites AB, or equivalent, with an average undergraduate grade of 'B', GRE in borderline cases, a required list of readings in the broad area of economics, three courses in economic theory, one in economic statistics, and one in economic development, politics in the modern state, or society and the individual Recommended undergraduate work in economics Faculty 31 full time, 18 part time 127 graduate students enrolled

Electrical Engineering General graduate course in electrical engineering power, control and instrumentation electrical communication, large scale computing devices, electromedical work, systems engineering Program conducted through Interscience Council Prerequisites BS in EE, or equivalent, from an accredited institution, degree with appropriate specialization and adequate preparation in connection with specialization in computers electromedical work, and system engineering, appropriate experience is required in connection with systems engineering Faculty 26 full time, 2 part time 662 graduate students enrolled

Engineering Mechanics Analytical, solid, and fluid mechanics Prerequisites satisfactory undergraduate training in engineering and/or physical science, 2 languages of technical importance

Faculty 9 full time 16 graduate students enrolled

English English literature, American literature, English philology Prerequisites A.B. with major in English, or the equivalent, a course in history of the English language Faculty 21 full time, 1 part time 126 graduate students enrolled

Fine Arts American art, Latin American art, architectural history Combined programs with anthropology (Middle American art), classical archaeology (ancient art) 19th century French and Far Eastern art (with Bryn Mawr College) Oriental art (Department of Oriental Studies) Prerequisites approx 20 semester credits distributed in approximately five of the generally recognized fields of the history of art, German and either French or Italian (except with special permission) Faculty 4 full time, 3 part time 12 graduate students enrolled

General Physiology Cell physiology, the colloid chemistry of protoplasm, the rational basis for antimitotic and carcinostatic action, aging of the protoplasmic colloid Recommended one year of physics, organic chemistry, physical chemistry Faculty 3 part time 8 graduate students enrolled

Germanics Faculty 5 full time, 1 part time 17 graduate students enrolled in residence, 18 in absentia

History Medieval, the Renaissance and Reformation, modern European, English (medieval and modern), American history to 1815, American history since 1815, Latin American, Far East Also other areas to meet the needs of individual candidates Prerequisites recommendations of sponsors, history and closely related subjects, French and German Faculty 12 full time, 4 part time 90 graduate students enrolled

Immunology Immunologic analysis of streptococci, formation of and purification of antibodies, and kinetics of their reactions Prerequisites microbiology, organic chemistry Recommended bacteriological laboratory work Program administered by Department of Public Health and Preventive Medicine Faculty 3 full time 2 graduate students enrolled

International Relations Western Europe, Far East, South Asia, Middle East, functional diplomacy, foreign economic policy, international law and organization This is an interdisciplinary program which draws on political science, history, economics and sociology courses offered

by other departments Prerequisites international politics, law, and economics, diplomatic history (Europe or U.S.), geography, area courses, 224 semester credits (minimum) Faculty drawn from other departments 35 graduate students enrolled

Linguistics Descriptive linguistics, historical linguistics, acoustic phonetics Program administered by Department of Classical Studies 10 graduate students enrolled

Mathematics Real analysis, complex analysis, algebra, general topology, algebraic topology, differential geometry, analytic number theory, partial differential equations, numerical analysis Prerequisites real analysis, complex analysis, algebra, topology, good grade record Faculty 12 full time 61 graduate students enrolled

Mechanical Engineering Prerequisites M.S. in Mech. Eng., mathematics, physics, or other branches of the physical sciences related to engineering Faculty 5 full time 1 graduate student enrolled

Medical Microbiology Microbial genetics and physiology, general medical microbiology, pleuropneumonia like organisms, cytology of microorganisms, virology, allergy and immunity, immunocatalysis and mechanisms of action of chemotherapeutics, tissue culture There is admission to courses in departments of botany and zoology, public health biochemistry, veterinary and dental medicine etc Student must satisfy Professor of Microbiology that he is promising Program administered by Microbiology Department, School of Medicine Faculty 19 full time, 2 part time 53 graduate students enrolled

Metallurgical Engineering Mechanical physics, and chemical metallurgy, physics of metals Doctorate in physics (solid state) also awarded in this field of study Program administered by Metallurgy Department Faculty 4 full time, 2 part time 49 graduate students enrolled

Music Musicology, theory, composition. Prerequisites entrance examination in music history and theory, French and German preferred, or German and Italian or Spanish Recommended B.A. in music, wide musical experience (practical), philosophy, English, history Faculty 4 full time, 1 part time 15 graduate students enrolled

Oriental Studies India and Iranian studies, Near Eastern studies, Far Eastern studies Fields languages, history, archaeology Prerequisites in anticipation of Hebrew studies at least 8 semester credits (or equivalent) in undergraduate

Hebrew, students specializing in archaeology and history must attain competence in languages bearing upon these studies, for language students, a basic course in linguistics, for history and archaeology students, prescribed courses under anthropology and/or classical archaeology Program administered by Department of Oriental Studies 21 graduate students enrolled

Parasitology Biology and physiology of parasites, referring particularly to the helminths Prerequisites foundation courses in biological and physical sciences, German and French Faculty 2 full time 1 part time

Pathology Veterinary pathology, cardiovascular pathology cancer Prerequisites chemistry (18 hours), physics (8 hours), mathematics (1 year), biology (1 year), for veterinary pathology --DVM or equivalent, high academic standing Recommended additional science courses 3 graduate students enrolled

Pharmacology Pharmacology of coronary circulation, influence of drugs on cardiac metabolism and arrhythmias Prerequisites bachelor's degree, anatomy, neuroanatomy, histology, physiology, biochemistry, pathology, bacteriology, pharmacology, reading knowledge of German and French Faculty 2 full time 2 graduate students enrolled

Philosophy History of philosophy (ancient medieval, modern, ethics logic and semantics social philosophy aesthetics (especially of music) Candidates allowed to take courses in other fields Competence in languages required for historical work Program administered by Department of Philosophy, Division of Humanities Faculty 8 full time Approx 40 graduate students enrolled

Physics Nuclear, solid state high energy, and low temperature physics Combined program in biophysics with Medical School Prerequisites undergraduate major in physics Recommended chemistry mathematics, engineering Program administered by Physics Department Faculty 14 full time 4 part time 120 graduate students enrolled

Physiology Mammalian physiology Recommended courses for admission chemistry through physical, mathematics through calculus, elementary and advanced physics, general biology or zoology Faculty 6 full time, 4 part time Approx. 20 graduate students enrolled

Political Science American constitutional

law, American political parties, state, local, and municipal government, comparative governments, public administration, public finance, international law, organization and politics, political theories Combined program with American civilization Prerequisites competence in social sciences as indicated by undergraduate record, GRE may be required in individual cases Faculty 14 full time, 1 part time 45 graduate students enrolled

Psychology General experimental, clinical, speech correction, vocational industrial, college student personnel, social Physiological psychology combined with Institute of Neurological Sciences Prerequisites general psychology, experimental psychology with laboratory, basic statistics, sound undergraduate training, broad background in sciences, particularly zoology, chemistry, physics, advanced mathematics, social studies Recommended tests and measurements, GRE Faculty 12 full time, 6 part time 85 graduate students enrolled

Romance Languages French philology, medieval literature, Renaissance, 17th, 18th, 19th, and 20th century Spanish medieval, Renaissance, 17th and 19th century Prerequisites philology, German, graduate course in language other than specialization, GRE in some cases, B average 46 graduate students enrolled

Slavic and Baltic Studies Russian language and literature, Balto Slavic philology, Polish language and literature Balto Slavic program is combined with Departments of Linguistics and Germanic Languages Prerequisites undergraduate major in Russian, or equivalent, M.A. in Slavic, or equivalent, Russian and one or two other Slavic languages, knowledge of history, geography, politics, political science, economics and sociology Recommended additional area courses, Greek language and literature, German language and literature 11 graduate students enrolled

Sociology Demography, social disorganization (including criminology), race and class, social institutions sociology and the individual, social theory Prerequisites undergraduate major in sociology, or equivalent, GRE in doubtful cases, good grades in undergraduate study Faculty 6 full time, 3 part time 116 graduate students enrolled

South Asia Regional Studies Concentration on modern languages, modern literature, recent his

tory, art, economics, sociology, political science, anthropology Prerequisites some social science and language background, survey course on South Asia, the equivalent of two years of study of an important modern language of the area, German and French Program administered by South Asia Regional Studies Faculty 11 part time 20 graduate students enrolled

Virology Host virus interrelationships in viral complement fixation antigens Prerequisites microbiology, organic chemistry Recommended laboratory work in virology Program administered by Department of Public Health and Preventive Medicine Faculty 5 full time 5 graduate students enrolled

Zoology Cytology, embryology (chemical, experimental, and morphologic), general physiology, genetics, and protozoology Combined programs in general physiology, interscience, Academy of Natural Sciences of Philadelphia, one M.S. with Dental School Prerequisites decided individually by graduate staff, organic chemistry and physics are required, but sometimes are taken after admission Recommended German and French, physical chemistry, some calculus Faculty 12 full time, 13 part time 31 graduate students enrolled

University of Pittsburgh

PITTSBURGH 13 PENNSYLVANIA

The Graduate Faculty

Graduate degrees were conferred by the University during the latter half of the nineteenth century to graduates who remained for additional studies. In 1852 five students received the M.A. In 1884 a two year program leading to the Ph.D. or M.A. was established, as well as a three year program leading to the Ph.D. These programs and others developed later became the responsibility of the Graduate School, which was founded in 1913 and functioned as an administrative unit of the University until 1957.

The present organization of graduate study under the Graduate Faculty of the University was developed during 1956-7 as part of a general revision of the University structure. All advanced degree programs are now included with

in the same graduate framework, observing the same basic standards and requirements, sharing the same ideals of scholarship. Immediate responsibility for the administration of graduate programs is assigned to the Graduate Faculty members and administrative officers of the schools and divisions in which the programs are carried out, but the fundamental requirements which all candidates for degrees must meet are established by the Graduate Faculty through its University Council on Graduate Study. Special or additional requirements in the various fields of graduate study are determined by the Graduate Faculty members in those areas.

Graduate School of Public Health offers the D.P.H. and the D.Sc. Hyg., Graduate School of Social Work awards the Doctor of Social Work.

Special collection of early Americana and materials relating to Western Pennsylvania and the Ohio Valley, observatory, radiation laboratory, laboratory of field biology at Lanesville, Western Pennsylvania Psychiatric Institute.

Men and women Summer and evening courses 101 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: last year of course work preceding research for the dissertation must be spent in full residence at the University.

ADMISSION REQUIREMENTS

Bachelor's degree and evidence of qualifications for advanced study.

At least two years of college level study of one foreign language (recommended but not required).

Recommended GRE—Aptitude test and Advanced tests.

Apply by August 15 for Fall semester, January 15 for Spring, June 1 for Summer session, to Office of Dean of School or Division administering the program.

FEES AND FIRST YEAR AID

Tuition—\$23 per credit, plus fee of \$2 per credit to maximum of \$24 per semester. Room—for men \$260 \$300 per year, for women \$324 per year. Board—\$500 (2 semesters).

Graduate assistantships, mostly in science departments, with stipend of \$1,500 for nine months and remission of tuition for 9 credits per semester. Graduate Council Scholarships, remission of tuition for one academic year, limited.

ited number of \$2,500 fellowships in the natural sciences Apply by February 15 to head of department for assistantships, for fellowships and scholarships, to the Dean of the Graduate Faculty

FIELDS OF STUDY FOR THE PH.D.

Astronomy Spectroscopic binaries Faculty 2 full time

Biochemistry Metabolism, nutrition, endocrinology The Biochemistry Department of the School of Medicine and the Department of Biochemistry and Nutrition of the Graduate School of Public Health make up the Division of Biochemistry University of Pittsburgh, Schools of the Health Professions, which administers the combined program Prerequisites B.Sc., with a major in chemistry, University of Pittsburgh Examination for Graduate Students Recommended biology Faculty 10 full time 9 graduate students enrolled

Biological Sciences Botany, zoology, bacteriology Combined program with Departments of Psychology and Biochemistry sometimes offered Prerequisites major in botany zoology, or bacteriology, two years of chemistry one of physics one of mathematics unless included in degree, University of Pittsburgh Examination for Graduate Students Faculty 12 full time, 1 part time 79 graduate students enrolled

Biophysics Combined program with virology offered with Department of Biological Sciences and the School of Medicine Prerequisites 1 year of botany, 1 of zoology, 2 of physics, mathematics through calculus general, analytical, organic, and physical chemistry 1 year of bacteriology and 1 of differential equations University of Pittsburgh Examination for Graduate Students Faculty 6 full time 13 graduate students enrolled

Chemical Engineering Mathematics, chemical engineering, Prerequisites BS in Ch.E. from a school curriculum approved by Engineering Council for Professional Development Faculty 3 full time, 1 part time. 38 graduate students enrolled

Chemistry Organic, physical, analytical, inorganic. A combined program with Physics Department is offered. Prerequisites general, analytical, organic, physical chemistry, mathematics through integral calculus, general physics, German, plus French or Russian. Recommended

courses in advanced inorganic, advanced organic, advanced physical chemistry Faculty 17 full time, 3 part time 129 graduate students enrolled

Classics Classical philology and its tradition Prerequisites an undergraduate major in the classics, competence in reading of Greek and Latin, comprehension of the historical and cultural development of Greek and Latin literatures, courses in histories of Greek and Latin adventures, reading knowledge of French and German (or Italian), competence in Greek, Latin and prose composition Recommended Greek and Roman civilization Faculty 3 full time 8 graduate students enrolled

Dentistry Prerequisites baccalaureate degree and a dental degree from a school offering a course of study of not less than 4 years Program is administered by the School of Dentistry Faculty 9 full time 14 graduate students enrolled.

Economics Economic theory, history, international trade, government and business, labor and allied fields, transportation, growth, industrial mobilization Prerequisites economic analysis, history of economic thought, statistics Recommended economic problems Faculty 10 full time, 5 part time 84 graduate students enrolled

Education Elementary, secondary, health and physical, business, vocational, religious, and general education, educational administration Combined program with psychology is offered for preparation of school psychologists Prerequisites minimum of 15 semester hours of professional courses in education and psychology Student is admitted provisionally and must earn a satisfactory score in University of Pittsburgh Examination for Graduate Students for full admission Faculty 29 full time, 1 part time 812 graduate students enrolled

Electrical Engineering Control, computer principles and applications circuit theory Two combined programs mathematics and engineering, engineering physics Prerequisites BS in E.E. (ECPD accredited) or BS in science with a major in another engineering area or science, with additional courses in electrical engineering Faculty 6 full time, 15 18 part time. 177 graduate students enrolled.

English English language and literature, American literature Combined programs with other departments (when desirable for certain students) Prerequisites freshman and sophomore English courses, at least 18 hours of upper

division work in English, fair amount of Latin
Faculty 12 full time 131 graduate students enrolled

Fine Arts History of art, iconology Combined programs may be worked out with History, Philosophy, and Psychology Departments Faculty 2 full time, 2 part time 6 graduate students enrolled

Geography Economic and aviation geography Faculty 2 full time, 1 part time 16 graduate students enrolled

Geology Sedimentation, stratigraphy, petrography, petroleum geology, paleontology Prerequisites general physics, chemistry and geology, college algebra and trigonometry, economic geology, structural geology, paleontology, mineralogy, petrography or petrology, summer field camp or alternate experience, seminar Recommended calculus, differential equations, 2 courses in petroleum engineering, statistics, cartography or engineering drawing Faculty 4 full time, 2 part time 16 graduate students enrolled

History Ancient, medieval, English, United States, Latin America, modern Europe, Asia and Africa, technology Prerequisites an undergraduate major in any of the social sciences and a minimum of 12 history credits at an accredited college, undergraduate average of B in the major and in history Faculty 13 full time 70 graduate students enrolled

Mathematics Abstract algebraic geometry, projective differential geometry, boundary value problems, mathematical statistics, probability theory, summability theory, topology, group theory, analysis geometry of the complex domain, applied mathematics Prerequisites a minimum of 24 undergraduate mathematics credits, including at least 6 credits beyond the first one year course in calculus Faculty 20 full time, 2 part time 124 graduate students enrolled

Mechanical Engineering Machine design, heat transfer, combustion, dynamics of machinery, stress analysis Prerequisites BS in ME from institution with ECPD accreditation, University of Pittsburgh Examination for Graduate Students Faculty 4 full time, 10 part time 137 graduate students enrolled

Metallurgical Engineering Prerequisites students transferring from other fields of engineering are required to take from 10 to 14 credits of undergraduate metallurgical engineering courses in preparation for graduate study in this field

Faculty 3 full time 40 graduate students enrolled

Modern Languages German and Romance literature Prerequisites survey of the literature concerned, for Romance literatures, reading knowledge of French, Spanish, and Italian, plus German Recommended one year residence in country of literature to be studied Faculty 5 full time 24 graduate students enrolled

Nursing Education Nursing education, nursing service administration, psychiatric nursing service and administration or education Combined programs offered with psychology and psychiatry, or with education and chemistry Prerequisites equivalent to the BSc in nursing education at the University of Pittsburgh. Administered by the School of Nursing Faculty 12 full time, 1 part time 93 graduate students enrolled

Pharmacy Pharmacy, pharmacy administration Administered by the School of Pharmacy Faculty 6 full time 18 graduate students enrolled

Philosophy Philosophy of religion and science, history of philosophy ethics social philosophy Prerequisites history of philosophy, logic, ethics Faculty 5 full time 20 graduate students enrolled

Physics Nuclear, solid state, atomic, and the optical physics, X ray crystallography, upper atmosphere physics and spectroscopy Combined program with Chemistry Department offered Prerequisites differential equations, intermediate courses in chief areas of classical physics, entrance examination Faculty 17 full time 97 graduate students enrolled

Political Science American government, national, state, and local government, international relations, comparative government, political theory, administration, political behavior, parties and pressure groups Prerequisites major in political science with basic course in American government, comparative government, political theory Faculty 6 full time, 4 part time 23 graduate students enrolled

Psychology Clinical, experimental, physiological counseling industrial and personnel, social, child Combined program with the School of Education to train public school psychologists Prerequisites minimum of 12 credits in psychology, MAT Faculty 12 full time, 1 part time 62 graduate students enrolled

Public Health Occupational health (industrial medicine) Administered by the School of Public Health Cooperates with the Department of Biochemistry (in the School of Medicine) to offer a program in biochemistry at the graduate level D.Sc Hyg. and D.P.H. also awarded in this field Faculty 19 full time 1 graduate student enrolled

Sociology Combined program offered with the School of Education Prerequisites an undergraduate major in sociology or introduction to sociology (6 credits) and social statistics and social research (6 credits) or a minimum of 12 credits in any case Screening tests given when there is doubt of candidate's qualifications Faculty 8 full time 34 graduate students enrolled

Speech and Hearing Disorders Special pathology and audiology Prerequisites GRE or MAT working knowledge of statistics and phonetics Recommended course in tests and measurements Faculty 7 full time 33 graduate students enrolled.

Apply before July 1, preceding the Fall semester to the Dean of the Graduate School

FEES AND FIRST YEAR AID

Tuition—\$20 per semester hour

Four full tuition scholarships four half tuition scholarships and two full tuition scholarships plus \$600 a year Apply to Dean of the Graduate School by April 1 preceding the Fall semester

FIELDS OF STUDY FOR THE PH.D.

Psychology Clinical, counseling, and general experimental psychology Prerequisites elementary statistics, history of psychology psychology of personality, introduction to psychological tests abnormal psychology two languages generally required for Ph.D. although statistics may be substituted for one of these

Princeton University

PRINCETON, NEW JERSEY

The Graduate School

Although graduate instruction had been given and degrees granted as early as 1877 the Graduate School was not established until 1905 It was conceived as a residential institution Candidacy for higher degrees is limited to male students admitted on a competitive basis under a limitation on enrollment in each department or field

Residence for 250 graduate students art museum Index of Christian Art, aeronautical science research center, nuclear accelerators nuclear fusion projects (chemical kinetics metallurgy and metal science) Affiliated with Brookhaven National Laboratory

Men only 95 Ph.D.s awarded in 1956 a full year of graduate study in residence University

Transfer students are not normally considered for admission

ADMISSION REQUIREMENTS

Bachelor's degree in a broad program of liberal education with strong evidence for fitness

University of Portland

PORTLAND OREGON

The Graduate School

The Graduate School was formally organized in 1946 graduate courses however were offered ten years prior to that date The purpose of the school is to form scholars and professional people

The Department of Education awards the Ed.D.

Psychological Services Clinic for graduate students in the areas of clinical psychology and counseling

Men and women. Summer and evening courses 1 Ph.D. awarded in 1956 7

Residence requirement for doctorate a minimum of 48 hours of work beyond the master's degree must be taken at the University

Six to eight hours of graduate credit may be transferred at the master's level eight to twelve at the doctor's

ADMISSION REQUIREMENTS

Scholastic Aptitude Test and Advanced Test of GRE in appropriate area

proposed subject of study Proficiency in languages is an asset.

GRE—Aptitude and Advance test in specialty

Apply to Graduate School, Box 270, Princeton, New Jersey, between December 1 and March 1 preceding Fall term.

FEES AND FIRST YEAR AID

Tuition—\$750 Room—\$275 to \$475 Board—\$525

Tuition scholarships at \$750, as well as junior fellowships of \$950 to \$1,150, including tuition, fellowships of \$1,450 to \$2,150, including tuition. Apply to the Graduate School between December 1 and March 1 preceding admission

FIELDS OF STUDY FOR THE PH.D.

Aeronautical Engineering Jet propulsion, aerodynamics, applied aeronautics GRE required. Faculty 12 full time, 1 part time 39 graduate students enrolled.

Architecture Historical, technical, and practical architecture, architectural composition, landscape architecture, and community planning Combined program offered with the Bureau of Urban Research. GRE required Faculty 14 full time, 3 part time 37 graduate students enrolled.

Art and Archaeology History of art, Christian art, archaeology, Renaissance and modern architecture, Chinese art. Combined program offered with the School of Architecture GRE required Faculty 12 full time, 2 part time 13 graduate students enrolled

Astronomy Practical astronomy, stellar systems and atmospheres, astrophysics GRE required Faculty 4 full time 3 graduate students enrolled

Biology Morphology, genetics, physiology, biochemistry and biophysics, endocrine systems, biological reaction rates GRE required. Faculty 11 full time, 2 part time 17 graduate students enrolled

Chemical Engineering Thermodynamics, kinetics, heat and mass transfer, phase change separations, fluid flow and fluidization unit processes. GRE required Faculty 8 full time 24 graduate students enrolled.

Chemistry Analytical chemistry, proteins, carbohydrates, pharmaceuticals and natural products, molecular rearrangements, kinetics and mechanisms, metal science, nuclear chemistry, and physical chemistry GRE required. Faculty

19 full time, 2 part time. 44 graduate students enrolled

Civil Engineering Soil stabilization, soil mechanics, model analysis, soil physics, water front structures, river port, and harbor engineering GRE required. Faculty 10 full time, 1 part time. 14 graduate students enrolled.

Classics Greek and Roman languages and literature, numismatics, inscriptions, economic, political, and general history, classical archaeology Combined program in Classical Archaeology with Department of Art and Architecture and with Princeton Theological Seminary Prerequisites Greek and Latin, GRE Recommended Greek and Roman history Faculty 13 full time, 5 part time 15 graduate students enrolled.

Economics and Sociology Mathematical economics, theory of games, national and international economic policies, sociological theory and statistics, industrial relations, population problems, urban research, international finance. GRE required. Faculty 26 full time. 34 graduate students enrolled

Electrical Engineering GRE required. Faculty 12 full time 20 graduate students enrolled.

English Old English, Middle English, Shakespeare and Elizabethan drama, 17th century, 18th century, 19th and 20th century English and American literature and drama Prerequisites Old and Middle English, Latin prose, GRE Faculty 27 full time, 1 part time 36 graduate students enrolled.

Geology Structural geology, chemical geology, mineralogy, paleontology and paleobotany, geochemistry, tectonophysics, GRE required. Faculty 13 full time 26 graduate students enrolled.

History Medieval history, Renaissance and Reformation, 17th and 18th century European history, French Revolution, 19th century modern European history, American Colonial and modern history, history of Russia. Prerequisites Latin in special cases, Greek and Spanish in others, GRE Faculty 19 full time 20 graduate students enrolled.

Mathematics Algebra, topology, analysis and probability, mathematical logic, theory of games, mathematical physics, mathematical statistics, differential equations, algebraic geometry Combined program in mathematical physics with Department of Physics, seminars in mathematical physics with the Institute for Advanced

Study GRE required Faculty 18 full time, 5 part time 38 graduate students enrolled

Mechanical Engineering Hydraulic power applied elasticity plastic properties steam and internal combustion fluid mechanics GRE required Faculty 10 full time 4 graduate students enrolled

Modern Languages and Literature French, German Spanish, and Italian literatures medieval and modern Prerequisites simple Latin prose GRE Faculty 22 full time 2 part time 11 graduate students enrolled.

Music Medieval musicology early Christian music music from 1600 to 1750 musical composition and analysis orchestration musical performance Prerequisites GRE Italian and Latin in special cases Faculty 9 full time 13 graduate students enrolled

Oriental Studies Ancient Semitic Islamic and Indo European studies Arabic Persian, Turkish languages Sanskrit Islamic Near East literature religion, philosophy art and social studies Prerequisites Hebrew Arabic, Aramaic, Syriac, Ugaritic and Accadian or two of Arabic Persian, Turkish GRE Faculty 11 full time 3 part time 20 graduate students enrolled

Philosophy History of philosophy logic theory of value and ethics metaphysics mathematical logic, philosophy of mind art, science religion, and social science GRE required Faculty 8 full time 1 part time 13 graduate students enrolled

Physics Classical physics spectroscopy nuclear physics elementary particles cosmic rays shock waves theoretical physics linear accelerators and cyclotron Combined program in physics and physical chemistry with Department of Chemistry GRE required Faculty 23 full time 2 part time 68 graduate students enrolled

Politics Constitutional law public administration international politics law and organization, state and local government Near East politics comparative government GRE required Faculty 15 full time 34 graduate students enrolled

Psychology Experimental psychology perception social psychology psychological tests psychometrics, mathematical learning theory GRE required Faculty 17 full time 3 part time 20 graduate students enrolled

Religion Old and New Testament, church history philosophy of religion, history of religion

systematic theology, Christian ethics GRE required Faculty 8 full time 13 graduate students enrolled

NOTES

Special programs are offered in several departments including English history and some sciences designed to develop college teaching

Purdue University

LAFAYETTE INDIANA

The Graduate School

Established 1929 but graduate study was authorized in some divisions in 1925 The first Ph.D. was conferred in 1928 Offers advanced courses in the pure and exact sciences

Special facilities include laboratory of applied physics laboratory of electrical measurements laboratory of chemistry central statistical laboratory speech and hearing clinic and laboratory of nucleonics and X ray laboratory in pharmacy laboratory of refrigeration and environmental sciences and the library of engineering history

There are in addition fifteen specialized laboratories for research in engineering, including a new facility for research in nuclear engineering There are also seven specialized laboratories for research in biological sciences and five specialized laboratories for research in the social sciences

Coeducational Summer courses 188 Ph.D.s awarded in 1956-7

Residence requirement for doctorate minimum of six semesters of full time residence at a university and at Purdue University for at least two semesters preferably the last two

Transfer students must meet the same admission requirements as beginning students

ADMISSION REQUIREMENTS

Applicants must show promise of ability to pursue advanced study and research and have adequate preparation in their chosen fields of study to enter at once upon graduate study in those fields In general students are admitted from the upper 40 per cent of their college grad

uating classes Others may submit GRE results

GRE is required of all applicants in engineering sciences, psychology, and industrial management, as well as applicants for the David Ross Fellowships

Apply at any time to the Dean of the Graduate School Students are admitted in September, January, and June

FEES AND FIRST YEAR AID

Tuition—in state \$225, out of state \$600 Room per month—for single students \$25 to \$40, apartments \$65 to \$125

Approximately 1,000 assistantships and 100 fellowships which pay from \$150 to \$300 per month are available. Assistants pay \$32 per semester fees, fellows pay full fees Apply to the Dean of the School prior to June 1 for the Fall semester, prior to April 1 for assistantships and fellowships Students may not apply for assistantships and fellowships until they have been admitted to the Graduate School

FIELDS OF STUDY FOR THE PH D

Aeronautical Engineering Aerodynamics, aircraft structures jet propulsion Cooperates in nuclear engineering graduate program Prerequisites graduation from accredited school, plus adequate training in engineering, mathematics, and physics Admission limited to upper 25 per cent of graduating class Faculty 12 of professional rank 30 graduate students enrolled

Agricultural Economics Management and production economies, work simplification, market agricultural prices, finance, and policy Admission not limited to graduates of agricultural colleges Technical courses in agriculture, economics or mathematics may be required without graduate credit Faculty 23 of professional rank 54 graduate students enrolled

Agronomy Plant genetics and breeding, plant physiology and nutrition soil fertility, soil microbiology, soil physics Cooperates in interdisciplinary programs in genetics, physiology, and bacteriology Prerequisites basic undergraduate courses in agronomy, biology, chemistry, and physics Faculty 24 of professional rank 64 graduate students enrolled

Animal Husbandry Animal genetics, animal nutrition, and animal physiology Cooperates in interdisciplinary program in genetics, physiology, and nutrition Prerequisites undergraduate

course that will qualify the student to carry advanced courses in genetics, nutrition, and physiology Faculty 9 of professional rank 16 graduate students enrolled

Biochemistry Biological chemistry, plant biochemistry, animal chemistry and nutrition Cooperates in interdisciplinary programs in food technology and nutrition Prerequisites undergraduate courses in chemistry, physics, and mathematics All entering students must take qualifying examinations in organic, analytical, inorganic, physical, and biochemistry Deficiencies in training must be made up without graduate credit Faculty 11 of professional rank 70 graduate students enrolled

Biological Sciences, including bacteriology, biophysics, plant sciences, and zoology

Bacteriology physiology and chemistry of microorganisms, taxonomy, cytology, industrial microbiology, immunology Prerequisites undergraduate courses in bacteriology and chemistry, qualifying the student to carry advanced work in these sciences Faculty 25 of professional rank 108 graduate students enrolled

Biophysics students may elect to meet the requirements either in physics or biosciences while pursuing research in the biophysics laboratories Prerequisites elementary physics, differential and integral calculus, physical chemistry, and elementary biology Students with deficiencies may be required to take additional courses in physics or biology before proceeding with courses in biophysics

Plant Science plant anatomy, cytology, ecology, nutrition, mycology, plant pathology, plant physiology, and taxonomy Prerequisites undergraduate courses in biology qualifying the student to undertake advanced study in plant science

Zoology general zoology, physiology, endocrinology, ecology, and parasitology Cooperates in an interdisciplinary program in animal physiology Must include a course at an approved coastal laboratory Prerequisites undergraduate courses in zoology, chemistry, physics, students entering with deficiencies must take appropriate courses without graduate credit

Botany and Plant Pathology Plant pathology, plant physiology, plant genetics, soil and agricultural microbiology Cooperates in an interdisciplinary program in genetics and plant physiology Prerequisites sufficient undergraduate train

ing in basic plant sciences and physical sciences to qualify the student to carry advanced courses in this field Faculty 19 of professorial rank 28 graduate students enrolled

Chemical Engineering Fluid dynamics, heat transfer, distillation, absorption and extraction, nuclear processes, high polymers thermodynamics, high pressure measurements, and applied reaction kinetics Cooperates in nuclear engineering graduate program Prerequisites graduates from accredited curriculum in chemical engineering, other engineering or science, sufficient training in chemistry, mathematics, and physics to carry advanced courses in this field Faculty 13 of professorial rank 67 graduate students enrolled

Chemistry Analytical, biological, inorganic, organic, and physical chemistry Prerequisites all students must take general orientation examinations before assignment to classes in first semester, one year of physics, mathematics through integral calculus, and a minimum of 35 semester credits in college chemistry Faculty 27 of professorial rank 285 graduate students enrolled.

Civil Engineering Transportation structures, soil mechanics, hydrology, hydraulics and sanitation Prerequisites graduates from accredited curriculum in civil engineering—graduates of other approved curricula in engineering or science, with sufficient preparation in mathematics, physical science and economics may be accepted, but may be required to take prerequisite under graduate courses in civil engineering without graduate credit Faculty 37 of professorial rank 99 graduate students enrolled.

Dairy Animal breeding and genetics, nutrition, physiology, and dairy bacteriology, in cooperation with intradisciplinary programs Prerequisites sufficient undergraduate training in agriculture and basic biological sciences to qualify the student to carry advanced courses in the areas of concentration Faculty 12 of professorial rank 10 graduate students enrolled

Economics Industrial economics Prerequisites preparation in the basic areas of economics, principles, theory, business organization, finance, labor, proficiency in mathematics through calculus Graduates with majors in engineering, physical science, and mathematics are preferred Faculty 20 of professorial rank 16 graduate students enrolled.

Education Agricultural education guidance.

Prerequisites sufficient undergraduate training in education and area of special interest to qualify student to carry advanced courses in this field, deficiencies must be removed without graduate credit Faculty 39 of professorial rank 192 graduate students enrolled

Electrical Engineering High voltage communications, electronics, machine design, automatic control mechanism Cooperates in nuclear engineering graduate program Prerequisites graduate from accredited curriculum in electrical engineering Graduates from accredited curricula in other engineering or physical science with sufficient training in mathematics, physics, and chemistry, may be accepted, but may be required to make up deficiencies without graduate credit Faculty 34 of professorial rank 114 graduate students enrolled

Engineering Sciences Continuum mechanics thermodynamics, systems analysis and synthesis, electrical science Cooperates in nuclear engineering graduate program Prerequisites graduate from approved engineering curriculum in the upper one third of class Students may be admitted from accredited curricula in physics and mathematics, but must make up deficiencies in engineering sciences without graduate credit, applicants must take GRE Faculty 14 of professorial rank 49 graduate students enrolled

Entomology Taxonomy morphology, bionomics, and applied entomology Prerequisites collegiate work in entomology, botany, chemistry, plant pathology, and zoology sufficient to qualify the student to pursue advanced courses in this field Faculty 6 of professorial rank 8 graduate students enrolled

Food Technology This is an intradisciplinary program supervised by a committee representing cooperating divisions of the Graduate School. Graduate students are attached to cooperating divisions.

Food and Nutrition (Home Economics) Students who wish to become candidates for the Ph.D. develop a plan of study including major and minor work from related departments Prerequisites sufficient undergraduate training to qualify for advanced courses in this field Faculty 10 of professorial rank 11 graduate students enrolled.

Genetics This is an intradisciplinary program supervised by a committee representing cooperating divisions of the Graduate School. Graduate

students are attached to cooperating departments

Horticulture Plant breeding and genetics, plant physiology and genetics Cooperates in interdisciplinary programs in food technology, plant physiology, and genetics Prerequisites basic undergraduate courses in horticulture and related sciences of botany, plant physiology, chemistry, entomology, genetics, physics, and mathematics Faculty 10 of professorial rank. 20 graduate students enrolled

Mathematics Algebra, analysis, applied mathematics, geometry, mathematical statistics, and topology Prerequisites undergraduate major in mathematics, physics, or engineering, must have mathematics from differential equations and advanced calculus, students without these courses must take them without graduate credit Faculty 44 of professorial rank. 101 graduate students enrolled

Mechanical Engineering Heat transmission, thermodynamics, refrigeration, fluid mechanics, internal combustion engineering, air conditioning, gas turbines, jet propulsion, and machine design Cooperates in nuclear engineering graduate program Prerequisites graduate of approved curriculum in mechanical engineering in the upper one fourth of the class Graduate of approved curricula in other engineering or physical sciences may be admitted, but must take prerequisite courses without graduate credit Faculty 31 of professorial rank. 118 graduate students enrolled

Metallurgical Engineering Cooperates in nuclear engineering graduate program. Prerequisites graduate from accredited curriculum in chemical or metallurgical engineering or science, sufficient training in chemistry, mathematics, and physics to carry advanced courses in this field

Pharmacy Pharmacy, pharmaceutical chemistry, pharmacology, and pharmacognosy Prerequisites graduate from accredited curriculum in pharmacy with sufficient basic courses in biology, chemistry, and pharmacy to carry advanced courses in this field Faculty 13 of professorial rank. 70 graduate students enrolled

Physics X rays, electron diffraction, electron microscopy, spectroscopy, physics of the solid state, electronics, high energy physics, physics of the high energy particles, cosmic rays, low temperature physics, biophysics, theoretical physics Cooperates in nuclear engineering graduate pro-

gram Prerequisites undergraduate major in physics Graduates in related fields may be accepted, but must make up prerequisite courses without graduate credit Faculty 33 of professorial rank. 83 graduate students enrolled

Plant Physiology This is an interdisciplinary program supervised by a committee representing cooperating divisions Graduate students are attached to the cooperating departments

Poultry Science Breeding and genetics, physiology, nutrition, and poultry products technology Cooperates in interdisciplinary programs in genetics and food technology Prerequisites basic undergraduate courses in biology, chemistry, economics, physiology, mathematics, genetics, and poultry science, qualifying the student to carry advanced work in this field Faculty 8 of professorial rank. 20 graduate students enrolled

Psychology Industrial, clinical, general experimental Prerequisites undergraduate major in psychology, in addition, training in mathematics and basic sciences to qualify the student to take advanced courses in psychology, GRE Faculty 20 of professorial rank. 174 graduate students enrolled

Sociology Sociological theory, marriage and the family, rural sociology, industrial urban sociology, and social organization Prerequisites minimum of 12 undergraduate semester credits in sociology Faculty 7 of professorial rank. 23 graduate students enrolled

Speech Speech pathology, audiology, voice science, discussion, persuasion, and public address Prerequisites undergraduate major in speech or a minor in speech and sufficient courses in physical, biological, or social science to prepare the student to take advanced courses in the area of his concentration Faculty 14 of professorial rank. 46 graduate students enrolled

Veterinary Science Animal pathology, animal physiology Cooperates in interdisciplinary programs in genetics and nutrition Prerequisites graduate of approved veterinary college or equivalent training in basic medical science Graduates in other fields may be accepted, provided they have sufficient background in biology and related subjects Faculty 12 of professorial rank. 46 graduate students enrolled

NOTES

Designed to increase the effectiveness of the doctoral candidate as a college teacher is a two-

course sequence—Psychology of Learning and Teaching Applied to College Work, and The American College and University

Examinations Most divisions require orientation examinations during the first week of the semester. All divisions require qualifying examinations or special written examinations in connection with the master's degree if the student expects to seek readmission to continue toward the doctor's degree. Written and oral preliminary examinations must be passed before admission to the candidacy. Final oral examination covers the research and thesis. Students must take examinations in written English. Candidates must pass appropriate examinations to demonstrate a reading knowledge of two languages selected from German, French, or Russian. On the recommendation of the student's advisory committee an appropriate two course sequence may be substituted for one foreign language.

Radcliffe College

CAMBRIDGE, MASSACHUSETTS

Graduate School of Arts and Sciences

Radcliffe College was founded in 1879 with the primary objective of making Harvard instruction available to women. The first graduate student was admitted in the same year, the first Ph.D. was awarded in 1902. By 1956 there had been 574 Ph.D.s awarded. In 1956 it awarded 36 Ph.D.s to women, more than awarded in that year to women by any other college in the United States.

All instruction is offered by the Harvard Faculty of Arts and Sciences. Radcliffe and Harvard students attend the same classes, take the same examinations, enjoy the same privileges, and are subject to the same academic rules and regulations. The Radcliffe diploma is signed by the presidents of Radcliffe and Harvard.

The Radcliffe Graduate Center, first unit of the Graduate Quadrangle, is a social meeting place and is the first graduate center for women built for this purpose in the country. In 1957 it houses 49 students when completed it will accommodate about 140. The College also owns three other small houses, accommodating an additional 40 graduate students.

Harvard Summer School courses may be taken. The College requires a minimum of two years (16 half courses) in residence for the doctorate. One of them may be taken elsewhere.

All laboratories, museums, and other facilities of Harvard University are open to Radcliffe graduate students.

32 Ph.D.s awarded in 1956-7

ADMISSION REQUIREMENTS

Bachelor's degree (or its equivalent). In general, languages are required for the receipt of a degree rather than for admission, and they vary from department to department.

GRE and MAT are required for psychology and social relations work only.

Admission examinations are given by the Department of Music in February. Apply between November 15 and February 1. In some cases applications will be considered up to August 15. Apply to Radcliffe Graduate School, 10 Garden Street, Cambridge 38, Massachusetts.

FEES AND FIRST YEAR AID

Tuition—\$800 plus \$56.50 health fee. After completion of 2 years, tuition is reduced to \$100 per term. **Room**—\$300 to \$700. **Board** in Graduate Center: two meals per day \$250 for two thirds of the meals served during the academic year.

A few fellowships are available from \$400 to \$1,000. Apply between November 15 and February 1 to Radcliffe Graduate School.

FIELDS OF STUDY FOR THE PH.D.

See Harvard University

NOTES

A non-credit course for prospective college teachers is given biannually and without charge in the evenings. It consists of lectures by faculty members, conferences, and speech training and practice.

Rensselaer Polytechnic Institute

TROY, NEW YORK

Graduate School

Founded in 1824. Rensselaer granted M.A. degrees between 1826 and 1834. In 1835 it con-

ferred the first degree in science and in engineering granted in any English speaking country. It is under the supervision of the Dean of the Graduate School and policies are recommended by the Graduate Council, which is comprised of graduate faculty members and representatives of the administration.

Rooms are available for graduate students, apartments for married students.

Other special facilities include an electron computing center, a Cobalt 60 unit, a radio astronomy observatory, a betatron, a Cockroft Walton accelerator, a nuclear chemistry laboratory, and a colloid and surface chemistry laboratory.

Summer and evening courses offered 16 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate one year, or its equivalent (thirty credit hours of work).

Not more than 60 credits may be transferred.

ADMISSION REQUIREMENTS

Records of applicants will be evaluated by the department of their major subject in terms of ability to pursue advanced study in chosen fields.

A reading knowledge of French, German or Russian is required, GRE in some cases.

Apply at any time to the Director of Admissions.

FEES AND FIRST YEAR AID

Tuition—\$35 per credit hour. Room—\$130 per term. Board—\$244 per term.

Assistantships of \$2,400 to \$2,700 annually, numerous fellowships, a loan fund. Apply simultaneously with application for admission to the Director of Admissions.

FIELDS OF STUDY FOR THE PH.D.

Aeronautical Engineering Aerodynamics, propulsion, aeroelasticity, and aircraft structures. Prerequisites: undergraduate degree, German or Russian, GRE, preliminary examination. Faculty: 9 full time, 23 graduate students enrolled.

Chemical Engineering Unit operations, thermodynamics, vapor liquid equilibrium, and kinetics. Prerequisites: B.S. in chemical engineering. Faculty: 5 full time, 23 graduate students enrolled.

Chemistry Analytical, inorganic, organic,

physical, medicinal, colloid, nuclear. Prerequisites: minimum American Chemical Society requirements for a bachelor's degree in chemistry, reading knowledge of German and French. Faculty: 15 full time, 2 part time, 100 graduate students enrolled.

Electrical Engineering Communications, electronics, power, control. Combined program in applied physics. Prerequisites: bachelor's degree in electrical engineering with scholastic grades of B or better on the average, German, French, or Russian required for candidacy, qualifying examinations near the beginning of the Ph.D. program. Faculty: 27 full time, 10 part time, 49 graduate students enrolled.

Geology Stratigraphy, sedimentology. Prerequisites: B.S. in geology equivalent to the R.P.I. curriculum. Faculty: 7 full time, 3 graduate students enrolled.

Mathematics Applied mathematics and analysis. Prerequisites: French and German, candidacy examination, written examinations in analysis, algebra, geometry, and applied mathematics. Faculty: 22 full time, 15 graduate students enrolled.

Mechanics Theory of elasticity, dynamics. Prerequisites: undergraduate courses in statics, dynamics, strength of materials, fluid mechanics. Faculty: 8 full time, 13 graduate students enrolled.

Metallurgical Engineering Welding, metallurgy, powder metallurgy, metal physics, metal chemistry, kinetics of metallurgical processes. Prerequisites: B average in technical field—overall average of C plus, at least 1 year of calculus, physics, chemistry, physical chemistry, reading knowledge of German only, GRE, written examinations in physical metallurgy, metal fabrication, and major fields, general oral examinations. Presentation and defense of thesis required. Ph.D. in solid state also awarded. Faculty: 10 full time, 4 part time, 30 graduate students enrolled.

Physics Nuclear, solid state, theoretical physics and astrophysics. Prerequisites: general physics, general chemistry, mechanics, electricity and magnetism, physical optics, thermodynamics, diagnostic orals, German and French or Russian. Faculty: 19 full time, 57 graduate students enrolled.

The Rice Institute

HOUSTON, TEXAS

The Rice Institute

First Ph.D. conferred in 1918. This degree represents a minimum of three years of advanced study in which the emphasis is placed on an original research project. Administration is through the Graduate Committee.

Men and women. Resident facilities on campus for unmarried men and women. 14 Ph.D.'s awarded in 1956-7.

Residence requirements for doctorate one year.

ADMISSION REQUIREMENTS

Undergraduate degree. In general a 'B' average in the advanced portion of the undergraduate record.

Applicants in science are expected to have a reading knowledge of German, in other divisions French, German, Latin, or Greek is acceptable.

Preference given to applicants with high scores on GRE.

Apply to departmental chairman between November and March 15.

FEES AND FIRST YEAR AID

Tuition—None, fees \$74-\$125. **Room**—men \$135 term, women \$150 term. **Board**—\$60 per month.

Scholarships, assistantships, and fellowships. Apply to departmental chairman between November and March 15.

FIELDS OF STUDY FOR THE PH.D.

Biology Parasitology, endocrinology, cellular physiology, micro-anatomy, genetics. Prerequisites: bachelor's degree with major in biological sciences, chemistry through organic, general physics, one year college mathematics. GRE recommended. Combined program with bio-physics. Faculty 6 full time, 13 graduate students enrolled.

Chemical Engineering Thermodynamics, heat and mass transfer, kinetics. Prerequisites: preliminary examination. Faculty 5 full time, 1 part time, 13 graduate students enrolled.

Chemistry Physical chemistry, theoretical, thermodynamics, micro-wave, colloid, crystallograph, organic, natural products, physical or organic. Prerequisites: 4 to 6 courses in chemistry. B average. Combined program with physics. Faculty 10 full time, 20 graduate students enrolled.

English Middle English, Renaissance and Elizabethan, 17th, 18th, 19th centuries. Prerequisites: see Admission Requirements, admission usually granted only to students with college work in some foreign language other than Spanish. Faculty 10 full time, 8 part time, 18 graduate students enrolled.

Geology Geochemistry, geophysics, geobiology. Prerequisites: high standing and major in geology, but majors in chemistry and physics accepted, senior level field course. GRE recommended. Graduate students take part of formal graduate courses in physics, chemistry, and mathematics on individually tailored programs. Faculty 4 full time, 15 graduate students enrolled.

History Medieval, 17th and 18th century English, American early national period, American South, American Civil War. Prerequisites: 4 to 6 advanced courses in history, GRE usually required, 'B' average. Supporting courses in philosophy, literature, etc. recommended. Faculty 8 full time, 2 part time, 7 graduate students enrolled.

Mathematics Analysis, real variable, complex variable, partial differential equations, topological algebra, number theory. Prerequisites: bachelor's degree from Rice Institute or another institution of similar standing, undergraduate work in mathematics indicating ability for advanced and original work. GRE recommended. Faculty 8 full time.

Physics Nuclear and solid state. Prerequisites: B.A. or B.S. in physics or E.E. in upper third of graduating class. Faculty 9 full time, 1 part time.

Romance Languages French literature (18th, 19th, and 20th centuries). Prerequisites: B.A., major in French, M.A. in French, or French and Spanish. Faculty 5 full time, 6 graduate students enrolled.

NOTES

Holders of assistantships assist in teaching.

University of Rochester

ROCHESTER, NEW YORK

The Graduate School, as an autonomous division of the University, was replaced July 1, 1957, by the Graduate Divisions of the constituent colleges. The College of Arts and Science, The School of Medicine and Dentistry, The Eastman School of Music, The University School of Liberal and Applied Studies. Work for advanced degrees is wholly under the supervision of the faculties of the respective college and is administered by an associate dean of each college.

Ph D work is supervised by a University Council on Graduate Studies, whose dean is the senior administrative officer.

Allied divisions (listed above) also award the A Mus D and M D.

Special collections of papers include those of Thomas E. Dewey, William Henry Seward, Thurlow Weed, Lewis H. Morgan. Music manuscripts, art gallery, Strong Memorial Hospital, two cyclotrons, electron microscopes, million volt X ray, radio telescope (through Associated Universities, Inc.), contact with Brookhaven National Laboratories (through Associated Universities, Inc.), computing center with IBM 650, biological laboratories of the Atomic Energy Commission.

Men and women. Summer and evening courses. 70 Ph D's awarded in 1956-7.

Residence requirement for the doctorate: one full year of residence after the master's, no part-time registration for the Ph D is permitted.

ADMISSION REQUIREMENTS

Completion of not less than 18 hours, exclusive of introductory courses, in the field of concentration, baccalaureate degree with overall undergraduate average not lower than B.

Some departments require one language for admission. GRE recommended.

Apply with completed forms and credentials at least one week prior to beginning of college term to the college in which the principal department is located.

FEES AND FIRST YEAR AID

Tuition—\$850 a year (for full time work)

Tuition scholarships at \$850, research and/or teaching assistantships at \$1,300 to \$1,500, graduate associateships in English and history at \$1,500. Apply by March 1 to the office of the college in which the principal department is located.

FIELDS OF STUDY FOR THE PH D

Anatomy Morphology, histochemistry, histopathology, nutritional deficiencies, muscular dystrophy, cytology, neurophysiology. Prerequisites: major in biology or biology and chemistry, A B or B S, GRE. Strongly recommend reading knowledge of one foreign language. Faculty: 7 full time, 4 part time. 1 graduate student enrolled.

Bacteriology Virology, microbial physiology, general medical microbiology, oral microbiology, animal parasitology, immunochemistry. Prerequisite: bachelor's degree in microbiology, general biology, or chemistry. GRE recommended. Faculty: 7 full time, 9 graduate students enrolled.

Biochemistry Nucleic acid and cytochemistry, isolation of oxidative enzymes, chromatography and identification of heme prosthetic groups, chromatography, identification and biosynthesis of phospholipides, oxidative phosphorylation. Prerequisites: generally a major in chemistry, courses in calculus, organic chemistry, physical chemistry, introductory biology. Desirable to have GRE, also elementary courses in French, German, statistics, genetics, and other chemistry courses. Faculty: 5 full time, 7 part time. 13 graduate students enrolled.

Biology Experimental embryology, viral biochemical and drosophila genetics, submicroscopic morphology, experimental cytology, photosynthesis, non enzymatic synthesis, plant and visual biochemistry, plant ecology. Prerequisites: 8 terms of biology, zoology, or botany, mathematics through calculus, physics (one year), physical or organic chemistry. Recommended reading knowledge of one foreign language, preferably French, German, or Russian. GRE, advanced training in mathematics, physics and chemistry. Faculty: 8 full time, 2 part time. 22 graduate students enrolled.

Biophysics Investigation of possible uses of antibodies as carriers of radiation for therapy, biological effects of ionizing radiations, distribution in nature of naturally radioactive substances, metabolic studies in mammals using radioactive

tracers, electron microscopy Occasionally there is a Ph.D. given in cooperation with other divisions of the Department of Radiation Biology and with Departments of Biology and Radiology Prerequisites generally a major in physics Recommended organic chemistry, physical chemistry, and introductory biology, reading knowledge of scientific French and German, GRE Faculty 9 full time 6 graduate students enrolled.

Chemical Engineering Rheology of suspensions properties of glass, bonding strength of adhesives two phase fluid flow flocculation and the aggregation of particulate matter, heat transfer gas dispersion and mass transfer, molecular distillation, agitation, filtration Prerequisites B.S. training, or equivalent, in chemical engineering from an accredited department. Graduates in chemistry or certain other branches of engineering will be admitted upon or during completion of no credit make up work. Recommended reading knowledge of one foreign language, preferably German or Russian General qualifying examinations given all applicants from other schools unless specifically waived. Faculty 3 full time, 3 part time 10 graduate students enrolled

Chemistry Organic and physical chemistry Prerequisites A.B. or B.S. in chemistry which includes as a minimum general, analytical, organic, and physical chemistry, mathematics through differential and integral calculus, physics, English, 15 hours of humanities, reading knowledge of German, "attainment" examination in September in organic and physical chemistry as a check up on undergraduate training Recommended French or Russian, second year of physics, additional mathematics, advanced courses in chemistry, such as advanced organic, advanced physical, advanced inorganic, advanced analytical (instrumentation) Program administered by Department of Biochemistry of the Medical School Ph.D. in biochemistry also awarded in this field. Faculty 11 full time, 1 part time. 57 graduate students enrolled

English Foreign literature is an essential part of the program. Prerequisites acceptable English concentration, either French or German Recommended GRE interview Faculty 17 full time, 2 part time 34 graduate students enrolled.

Geology and Geography Mineralogy, paleontology, stratigraphy, structural geology, sedimentation petrology Prerequisites B.S. or A.B. in geology, basic college courses in physics, chem-

istry, mathematics, paleontology, and mineralogy Recommended biology for paleontology majors, GRE Faculty 4 full time. 5 graduate students enrolled.

History American, European Candidates may offer one field outside of history—literature, political thought, sociology, history of philosophy, etc Prerequisites 24 to 30 hours work in history, interview Recommended reading knowledge of at least one modern foreign language, GRE Faculty 8 full time. 65 graduate students enrolled.

Mathematics Analysis (functional, partial differential equations measure theory, Fourier analysis, complex variables), algebra, point set topology, numerical analysis Prerequisite undergraduate major in mathematics or equivalent. Faculty 10 full time, 1 part time 13 graduate students enrolled

Music (Composition) Prerequisites 18 hours of composition, 12 hours of lower division theory, 12 hours of upper division counterpoint and orchestration, theory placement examination, experience in writing in the larger forms A.Mus.D. also given in this field Faculty 12 full time. 8 graduate students enrolled

Music (Music Education) Prerequisites normal undergraduate courses leading to bachelor's degree in public school music, Seashore talent tests, theory placement tests. Recommended 2 years of teaching Faculty 12 full time. 1 graduate student enrolled

Music (Musicology) Prerequisites 10 hours in history of music, including 4 hours of upper division courses, 18 hours of theory including 6 hours of upper division 12 hours of German or French, theory placement and music history placement examinations Faculty 12 full time. 3 graduate students enrolled.

Music (Theory) Prerequisites 24 hours of theory including 10 hours of upper division courses, theory placement examination. Recommended 1 year each of counterpoint and orchestration. Faculty 12 full time 18 graduate students enrolled

Optics Radiometry, photometry, spectroscopy, solid state Combined program with Physics Department offered. Prerequisite B.S. or A.B. in physics, mathematics or electrical engineering Recommended GRE, reading knowledge of one foreign language, preferably French or German.

Faculty 8 full time, 6 part time 34 graduate students enrolled

Pathology Neoplasia and relation to changes in connective tissue, connective tissue metabolism, problems in bone resorption DDS or MD required Faculty 5 full time 3 graduate students enrolled

Pharmacology Cell physiology, bone metabolism, neuro pharmacology, drug metabolism, pharmacodynamics and biological effects of inhaled materials, studies of the effects of radiation and radioactive material on cellular metabolism Prerequisite BS in chemistry or biology GRE recommended. Faculty 21 full time 12 graduate students enrolled

Physics and Astronomy Low energy nuclear, high energy nuclear, cosmic ray, and theoretical nuclear physics, theoretical astrophysics Combined program offered with Optics Department Prerequisites BS or AB in physics or astronomy (in special cases students with other majors may be admitted) Recommended reading knowledge of one foreign language, preferably German or Russian, GRE Faculty 22 full time 53 graduate students enrolled

Physiology Nitrogen narcosis, potassium in muscle, riboflavin analogues, calcium in muscle, physiology of the new born, thyroid secretion protein metabolism Prerequisites in general, the BS in pre medical sciences, including calculus, physics, biology, comparative anatomy, organic chemistry, qualitative and quantitative analysis, physical chemistry, advanced organic chemistry, general physiology, statistics, any additional science Recommended 2 languages Faculty 10 full time, 3 part time 7 graduate students enrolled

Psychology General, physiological, social, human engineering, clinical, psycho pharmacology Prerequisites AB or BS, 18 hours of advanced undergraduate psychology with grades of B or better Recommended GRE, MAT, courses experimental psychology, statistics, some biology, and sociology Faculty 10 full time, 16 part time 63 graduate students enrolled

Sociology Ethic and race relations, social disorganization, urban community, small group, family, sociological theory, industrial sociology Prerequisites AB and an undergraduate concentration in sociology (24 30 hours or equivalent) Recommended reading knowledge of one foreign language, interview, GRE Faculty 4

full time, 2 part time. 20 graduate students enrolled

NOTES

Supervised teaching is included as required part of Ph D programs in several departments, including English, History, and Biology

Rutgers University

NEW BRUNSWICK, NEW JERSEY

Graduate School

Provisions for graduate study were first made in 1876 Graduate instruction given in the arts and sciences, agriculture, engineering, home economics, and pharmacy Limited resident facilities for graduate men and women

Agricultural experiment station, engineering experiment station, research bureaus biological, mineral economic, government, foundation for study of practical politics, institute of microbiology, extensive collection of New Jerseyana

Men and women State university of New Jersey Summer and evening courses 64 Ph D's awarded in 1956-7

Residence requirements for doctorate three years of graduate study, graduate course credit equivalent to one year of graduate study may be transferred from other universities, reading knowledge of German and French, qualifying examination—oral and/or written, dissertation consisting of original, scholarly research.

ADMISSION REQUIREMENTS

Graduates of accredited institutions in upper half of their graduating classes Transcripts, three letters of recommendation. Department chairmen recommend selection of candidates on basis of preparation, qualifications, and promise for success in specific graduate programs

Recommended French and German, GRE or MAT

Apply to Admissions Office by September 7 for Fall term, by January 7 for Spring term, by June 7 for Summer session

FEES AND FIRST YEAR AID

Tuition—full time students (enrolled for 12

or more credit hours per term), \$200 per term, part time students, \$13.50 per credit hour Room—men \$150 per term.

Limited number of tuition scholarships Apply to Dean of the Graduate School by March 1 for Fall term, by December 1 for Spring term.

FIELDS OF STUDY FOR THE PH D

Agricultural Biochemistry Animal nutrition, especially poultry, protein absorption and metabolism, insect nutrition effect of protein nutrition on hormones and enzymes general biochemistry Prerequisites bacteriology, botany, mathematics, physics, zoology, organic chemistry, quantitative analysis Calculus and physical chemistry recommended. Combined program with agricultural microbiology physiology and biochemistry, chemistry, poultry Faculty 4 full time 8 graduate students enrolled

Agricultural Microbiology Soil microbiology—factors affecting decomposition of organic matter, physiology of nitrifying bacteria, transformation of sulfur by microorganisms, factors affecting persistence of microorganisms in sea water Prerequisites courses in microbiology and other areas of biology, chemistry through organic, recommendations concerning ability scholarship and personality Recommended fundamental training in sciences, English, and foreign languages Faculty 2 full time 3 graduate students enrolled

Bacteriology Bacterial physiology and chemistry, general and pathogenic microorganisms Prerequisites chemistry through organic, 1 year of physics, 1 year of bacteriology Faculty 3 full time 19 graduate students enrolled.

Botany Anatomy, cytology, morphology, physiology, ecology, taxonomy, radio biology Prerequisites 1 year mathematics and physics chemistry through organic, major in biological sciences Faculty 4 full time, 1 part time 14 graduate students enrolled

Ceramics Ceramics and ceramic engineering, particularly enamels, glass refractories, structural clay products white wares (china, porcelain, electrical ceramics) Prerequisites college chemistry, physics, and mathematics particularly physical chemistry Combined program with chemistry, physics, electrical engineering, engineering research Faculty 3 full time 19 graduate students enrolled

Chemistry Inorganic chemistry Boron com

pounds, general inorganic chemistry, organic chemistry natural products, physical—organic, physical chemistry X ray crystallography, polymer chemistry, infrared spectroscopy, analytical chemistry Ion exchange chromatography, instrumental techniques Prerequisites at least four basic chemistry courses 16 through physical chemistry, placement test upon entering, written qualifying examinations by end of second year Faculty 11 full time 75 graduate students enrolled.

Dairy Dairy cattle breeding, dairy cattle nutrition, animal fertility, frozen semen for artificial breeding, physiology of reproduction, milk secretion, dairy products chemistry, milk sanitation, crop preservation Prerequisites mathematics, chemistry (quantitative and qualitative), biology (genetics), bacteriology, biochemistry, physics, nutrition, animal physiology, written test for students being admitted with M.S. from other institutions Faculty 7 full time 11 graduate students enrolled

Economics Economic theory, economic history, international economics, economics of labor, monetary economics Faculty 9 full time 23 graduate students enrolled

Electrical Engineering Electronics, electric circuits and networks, electromagnetic wave theory Prerequisites B.S. in E.E., must be in top quarter of average class Combined program with mathematics and physics Faculty 10 full time, 8 part time 19 graduate students enrolled

English Middle ages Renaissance, 18th century English, 19th century English, 19th century American literature Prerequisites major in English with high record GRE favored Faculty 12 full time 1 part time 47 graduate students enrolled

Entomology Economic entomology, insect physiology insect toxicology, morphology and taxonomy Prerequisites B.S., with emphasis on biological science courses Recommended GRE courses in chemistry, mathematics, physics Faculty 12 full time 19 graduate students enrolled.

Farm Crops Breeding, weed control, management Prerequisite B.S. in agriculture Combined program with soils, agricultural engineering, meteorology, plant pathology Faculty 7 full time, 1 part time 21 graduate students enrolled

Food Chemistry and Technology Application of the basic sciences to the field of food preser

Prerequisites mathematics through calculus, chemistry through physical, physics (light, heat, optics) Combined program with mathematics, chemistry, microbiology Faculty 3 full time, 1 part time 10 graduate students enrolled

Geology Economic geology, mineralogy, petrology, stratigraphy, paleontology, sedimentation, general geology Prerequisites 1 year general chemistry, 1 year physics, mathematics through trigonometry and analytical geometry, one term courses or equivalent in physical geology, historical geology, structural geology, invertebrate paleontology, determinative mineralogy, optical mineralogy, petrology, petrography, stratigraphy and field geology GRE recommended Program combined with invertebrate geology and zoology Faculty 6 full time 21 graduate students enrolled

History Most areas of European, American and Latin American history French and German, plus language specially required by candidate's research program Each candidate must offer a minor in another field Faculty 11 full time 36 graduate students enrolled

Horticulture Horticulture—ornamentals, floriculture, pomology, vegetables, landscape design Prerequisites horticulture with basic courses in botany chemistry, plant physiology, physics, mathematics, a minor in soils, plant physiology, plant pathology or other allied fields Faculty 10 full time 24 graduate students enrolled

Mathematics Complex analysis real analysis algebra topology Prerequisites major in mathematics with courses through advanced calculus and differential equations Faculty 8 full time, 4 part time 25 graduate students enrolled

Microbiology General microbiology, microbial physiology and biochemistry, antibiotics, vitamins and enzymes, ecology and genetics of microorganisms immunochemistry, applied microbiology Prerequisites major in biological or chemical sciences adequately supported by physics and mathematics One or two minor fields in closely related areas may be chosen in other divisions Recommended training in chemistry, biology, physics bacteriology, GRE Faculty 16 full time, 6 part time 30 graduate students enrolled

Physics Low temperature solid state physics, nuclear magnetic resonance, electronic paramagnetism, nuclear emulsion studies Prerequisites

major in physics or equivalent Faculty 15 full time 28 graduate students enrolled

Physiology and Biochemistry Enzymology, ionic relationships, nutrition, exercise, blood Prerequisites calculus, 1 year of physics, 2 years of chemistry, 3 years of biology Faculty 3 full time, 2 part time 30 graduate students enrolled

Plant Pathology Diseases of fruits, vegetables, ornamental and field and forage crops, antibiotics for plant disease control, fungicides, post harvest diseases of fruits and vegetables Prerequisites basic courses in botany, chemistry, physics, bacteriology Faculty 8 full time, 7 graduate students enrolled

Plant Physiology Inorganic nutrition, trace element metabolism, growth regulators, plant cell wall chemistry Prerequisites BS with general, analytical and organic chemistry, mathematics physics and either botany or biology, acceptable academic record with faculty recommendations Recommended courses in biochemistry, physical chemistry plant anatomy, cytology, histology morphology Combined programs minor(s) in such fields as botany biochemistry, chemistry Faculty 3 full time 4 graduate students enrolled

Political Science American national government and constitutional law, citizenship, parties, politics, public administration, state and local government, political philosophy, international politics, foreign governments (Europe and the Commonwealth), government and politics of the Far East Prerequisites 6 semester credits in American government or its equivalent, and at least 12 additional credits in political science or in subjects closely related thereto, minor required in some other social science department Faculty 5 full time, 4 part time 39 graduate students enrolled

Poultry Poultry physiology poultry nutrition Prerequisites BS with emphasis on biological science courses Combined program with agricultural biochemistry Faculty 4 full time 6 graduate students enrolled

Psychology General and experimental Prerequisites undergraduate program in psychology favored, MAT or GRE Recommended courses in biology, physiology, mathematics, physics Faculty 6 full time, 1 part time 13 graduate students enrolled

Sanitation Stream pollution sewage treatment, industrial waste treatment, water purifi-

cation, air pollution. Prerequisites BS in chemistry, biology, chemical engineering or sanitary engineering Faculty 5 full time, 1 part time 11 graduate students enrolled.

Soils Soil chemistry and fertility, soil physics soil genesis, morphology and classification, soil mineralogy, pedology, physical chemistry of soils Prerequisites chemistry (qualitative and quantitative) organic chemistry, physics, mathematics, biology, plant physiology, bacteriology geology, soils Combined programs with plant physiology, botany, farm crops, horticulture, geology, agricultural microbiology, agricultural biochemistry, meteorology Faculty 8 full time, 1 part time, 15 graduate students enrolled.

Zoology Aquatic biology, embryology, endocrinology, genetics and evolution, invertebrate zoology, parasitology, serology, terrestrial ecology, vertebrate zoology Prerequisites undergraduate major in biology, 1 year of physics, 1 year of mathematics, chemistry through organic, 12 semester courses in biology Students often have minors in physiology and biochemistry Faculty 10 full time 45 graduate students enrolled

St. Bonaventure University

ST. BONAVENTURE, NEW YORK

School of Graduate Studies

Located in southwestern New York, the University dates from 1856. It occupies 500 acres of land, sixty per cent of which is woodland. Conducted by the Franciscan Fathers (Province of the Holy Name), it operates under a charter granted by the State of New York in 1875.

Unique is the Franciscan Institute with its special collection of Franciscana, Incunabula, and manuscripts dealing chiefly with the Scholastic period. Dormitories housing approximately 1,000 students.

Summer and evening courses 1 Ph.D. awarded in 1956-7

Residence requirement for doctorate 3 years

Transfer students must have a masters degree, only six semester hours (in a minor field) of "B" grade or better graduate credits are accepted.

ADMISSION REQUIREMENTS

Bachelor's degree, a minimum of eighteen semester hours of undergraduate preparation in the subject to be pursued, well above average undergraduate record

GRE either before admission or during first term

Apply to Graduate Office at least six weeks prior to the opening date of the term in which admission is sought.

FEEES AND FIRST YEAR AID

Tuition—\$17 per credit hour

A small number of graduate assistantships in some departments. Apply to the departmental chairman.

FIELDS OF STUDY FOR THE PH.D.

Biology Anatomy, microbiology, natural history Prerequisites zoology, botany, anatomy, histology, embryology or genetics, bacteriology, GRE, preliminary qualifying examinations Faculty 5 full time, 3 part time, 12 graduate students enrolled

Franciscan Studies Franciscan history, theology and philosophy, palaeography Combined program with the School of Theology and the Department of Philosophy Prerequisites ability to read manuscripts of the 13th-15th centuries, as well as all documents in ancient and foreign languages that pertain to the research problem, GRE. Faculty 3 full time, 4 part time, 18 graduate students enrolled

St. John's University

Founded as St. John's College in 1870, the University is conducted by the Priests of the Congregation of the Mission.

The Graduate School of Arts and Sciences was formally organized in 1914 although graduate instruction and degrees were offered earlier. Courses leading to a doctoral degree were first offered in 1933. The Graduate School is located in Jamaica, NY. 4 Ph.D.s awarded in 1956-7.

The School of Education, the first professional department of the University, was established in 1908. In 1955 this School took over the Grad

uate Department of Education, offering its first graduate degrees. The Graduate Department of the School of Education is located in Brooklyn, N.Y.

School of Law awards Doctor of Science of Law. The Department of Nursing, of the School of Education, offers a doctoral degree.

Summer and evening courses are available.

Residence requirements for doctorate two years, during which 24 semester hours of course work must be completed.

The Graduate School of Arts and Sciences

ADMISSION REQUIREMENTS

Bachelor's and masters degree, reading knowledge of French and German. If another language is used as a tool of research, an examination in that language is required. Department of Chemistry requires a qualifying examination.

Apply between April 15 and August 15 (for Fall term), December 1 and January 1 (for Spring term), to Office of Registrar, Graduate School of Arts and Sciences, St. John's University, Jamaica 32, N.Y.

FEES AND FIRST YEAR AID

Tuition—\$23 per semester hour for non science courses, \$25 for science courses.

Assistantships and fellowships in all departments. Apply before March 1 to Office of the Dean. Obtain applications for scholarships from Chairman of Scholarship Committee, file before May 1.

FIELDS OF STUDY FOR THE PH.D.

Biology Parasitology, physiology, zoology, and microbiology. Combined program with Departments of Chemistry, Physics, and Mathematics. Students urged to spend at least one summer at a nationally recognized laboratory, such as the Marine Biological Laboratory or the Brookhaven National Laboratory. Faculty 6 full time. 13 graduate students enrolled.

Chemistry Analytical, inorganic, organic, and physical chemistry. Students take minimum of six semester hours in graduate mathematics or physics. Faculty 5 full time.

English Origins and Medieval literature (560

A.D. 1485), Elizabethan literature (1485-1660), Restoration and 18th century literature (1660-1798), 19th century literature (1798-1900), American literature, contemporary literature and criticism. Prerequisites: Anglo-Saxon literature, philosophy of literature, seminar in field of specialization, a course in methods and materials of research and in Chaucer must be taken (if they were not previously completed in a master's program). Faculty 3 full time, 1 part time. 18 graduate students enrolled.

History European (1520-1815), (1815-1914), American (1492-1865), (1865-1914), 20th century. Combined program with Department of Social Science, Political Philosophy, and Political Science. Prerequisites: philosophy of history, seminar in field of specialization, course in methods and materials of research (if not previously completed in a master's program). Faculty 3 full time. 19 graduate students enrolled.

Philosophy Faculty 4 full time. 2 graduate students enrolled.

Political Science International law and relations, government and public administration, political theory. Faculty 5 full time.

Social Science Prerequisites: course in Statistical Methods I, seminar in field of specialization. If courses in methods and materials of research, Statistical Methods II, and social and political philosophy of St. Thomas have not been included in the master's program, they must be taken. French and German (however, with Departmental approval, Statistical Methods I II passed with a 'B' grade may be substituted for one of the languages, but no degree credit will be given for the course). Faculty 2 full time. 3 graduate students enrolled.

Graduate Department, School of Education

ADMISSION REQUIREMENTS

Undergraduate degree, with a minimum of 2 years in liberal arts courses. Committee on Admissions evaluates all applications.

French and German, educational statistics.

GRE Comprehensive examination for evaluation given upon completion of 12 hours of work. A passing grade is necessary before candidate can fully matriculate.

Apply to the Director of Admissions one semester prior to entrance

FEES AND FIRST YEAR AID

Tuition—\$23 a point, plus fees.

Scholarships and fellowships are available. Apply to Registrar, School of Education, by April 15 of the previous school year.

FIELDS OF STUDY FOR THE PH D

Education Administration and supervision, guidance, psychology. Prerequisites: master's degree, plus courses in educational research, methods and materials, scholastic psychology, history of education, principles and philosophy of education, GRE, teaching experience. Guidance experience and administrative experience for respective degrees. Faculty: 6 full time, 6 part time. 32 graduate students enrolled.

St. Louis University

ST LOUIS, MISSOURI

St. Louis University Graduate School

Established in 1832. First Ph.D. conferred in 1883. Administered by an autonomous Board of Graduate Studies and the Dean. All programs of the University beyond the bachelor's degree or the first professional degree are under the academic administration of the Graduate School.

Men and women. Some fields in summer, and evening courses in fields of commerce and chemistry. 36 Ph.D.s awarded in 1956-7.

Residence requirements for doctorate: three years, including one year of full time residence.

Vatican microfilm library, Center for Human Relations Training and Research, Curriculum Laboratory, three seismological stations, meteorological observatory, biological station near Steelville, Mo., affiliation with Midwest Library Center and Argonne National Laboratory. Largest Catholic medical center in the world.

ADMISSION REQUIREMENTS

Undergraduate degree. Admission determined on basis of general preparation, previous scholarship ability and qualifications for each program.

French and German examinations. Transcripts and three letters of recommendation. GRE recommended.

Apply at least six weeks in advance of registration.

FEES AND FIRST YEAR AID

Tuition—\$20 per credit hour, \$30 for geo-physics, seismology, and meteorology.

Applications for fellowships and scholarships should be filed with the Graduate School early in the semester previous to registration, application for loans filed with Dean of Student Affairs.

FIELDS OF STUDY FOR THE PH D

Anatomy Anatomy, neuroanatomy, histology, embryology. Prerequisites: equivalent of an undergraduate major in biology which must include the lower division course in chemistry, physics and biology prerequisite to the 18 semester hours of upper division biology courses required, comparative anatomy and comparative embryology must be included in the upper division prerequisite courses. Faculty: 7 full time, 7 graduate students enrolled.

Biochemistry Steroid metabolism, bile acid metabolism, enzymes, tissue enzyme systems, nutrition. Prerequisites: equivalent of an undergraduate major in chemistry which must include the lower division courses in chemistry, mathematics, and physics prerequisite to the 40 hours of upper division courses required in chemical principles, organic chemistry, advanced analytical chemistry, physical chemistry, inorganic chemistry, and chemical literature. Previous work in biology desirable. Recommended course in biology including comparative anatomy. Faculty: 8 full time, 16 graduate students enrolled.

Biology General physiology, morphology, genetics, comparative physiology, cytology, protozoology. Prerequisites: equivalent of an undergraduate major in biology which must include the lower division courses in chemistry, physics, and biology prerequisite to the 18 semester hours of upper division biology courses required, upper division courses in comparative anatomy and embryology must be included. Faculty: 7 full time, 21 graduate students enrolled.

Chemistry Analytical, inorganic, organic, and physical chemistry, with special research facilities for organic synthesis, kinetics of organic reactions, molecular spectra, properties of solu-

tions, dielectric constants, X ray spectroscopy, chemistry of the hydrides of boron, and analytical chemistry. Students whose transcripts do not qualify them for above prerequisites may qualify if they pass entrance examinations. Faculty 10 full time, 1 part time. 62 graduate students enrolled.

Classical Languages Greek, Latin. Minors in classical antiquities, Greek, Latin, linguistics. Prerequisites 18 semester hours of upper division courses, including Greek historical writers, Greek poets, Greek dramatists, and one course in classical antiquities for Greek, history of Latin literature, one literary type course, one course in classical antiquities for Latin. Tests qualifying examination to establish ability to translate at sight from Greek or Latin to English, from English to Greek or Latin, and to test knowledge of the history of the literature concerned. Faculty 4 full time, 3 part time. 21 graduate students enrolled.

Economics Programs intended to prepare for careers in government, industry, and teaching. Prerequisites 18 hours of upper division work, including a course in introduction to statistics, intermediate economic analysis, national income and business fluctuations, and either economic development of the United States or economic history since the industrial revolution. May offer mathematics in place of either French or German. Participation in program leading to the doctorate in Business Administration and Control. Faculty 8 full time, 4 part time. 19 graduate students enrolled.

Education Guidance and counselling, administration, supervision at primary, secondary, and university levels, teacher training, curriculum. Prerequisites 18 semester hours of upper division courses including philosophy of education and introduction to tests and measurements, qualifying examination designed to measure general mental ability. Faculty 11 full time, 2 part time. 146 graduate students enrolled.

English The Middle Ages, the Renaissance, Renaissance drama, the Restoration and 18th century, the 19th century, American literature, modern literature, literary criticism, novel, drama. Prerequisites 18 semester hours of upper division courses including Chaucer, Shakespeare, 18th century, 19th century, American literature, practical criticism, qualifying examination, if master's has not been attained. Recommended

at least 12 semester hours of Latin or Greek or both. Faculty 12 full time. 42 graduate students enrolled.

Geophysics Geophysics, meteorology, seismology. Prerequisites geophysics—physical geology, historical geology, minerals and rocks, structural geology, college physics, differential equations, electric circuit analysis (3), electronic circuits, vector analysis, elements of potential theory (3), force fields of the earth, surveying, in addition, for earthquake seismology—earthquakes, interpretation of earthquake records, in addition, for geophysical exploration—exploration geophysics, in addition for seismological engineering—strength of materials, applied mechanics (statics and dynamics), structural and ground vibrations with all their course prerequisites, oral and written examinations to test technical preparation and ability of applicant to express himself well. Faculty 7 full time, 1 part time. 22 graduate students enrolled.

Government Prerequisites 18 semester hours of upper division courses in government, including American government, history of political thought, international relations, comparative government, qualifying examination. Faculty 6 full time, 1 part time. 31 graduate students enrolled.

History Medieval, modern European, American, intellectual. Prerequisites 18 semester hours of upper division courses, including at least one course from the Middle Ages, two courses in modern European history, and two courses in United States history. Faculty 11 full time, 3 part time. 54 graduate students enrolled.

Management Prerequisite BS in commerce. Statistics may be substituted for one of the modern languages. Programs are offered under Business Administration leading to the Ph.D. Faculty 9 full time. 191 graduate students enrolled.

Mathematics Topology, number theory, mathematical statistics, algebra, analysis. Prerequisites 18 semester hours of upper division courses, including Calculus I and II, differential equations, and determinants and matrices, or solid analytic geometry or elements of modern algebra. Faculty 6 full time, 2 part time. 22 graduate students enrolled.

Microbiology Virology, including bacteriophages, bacterial metabolism and physiology, immunology and serology, microbial genetics, medical microbiology, tissue culture, biochemistry of normal and virus infected cells in tissue culture.

Prerequisites thorough training in biology, physics chemistry, mathematics oral and written examination Faculty 6 full time, 1 part time 2 graduate students enrolled

Pathology Prerequisites M.D. from a recognized school of medicine A year of clinical internship after receiving M.D. is desirable Faculty 4 full time, 9 part time

Pharmacology Prerequisites 18 hours of upper division courses Faculty 3 full time 1 part time 1 graduate student enrolled

Philosophy History of western philosophy all principal areas of systematic philosophy Prerequisites 18 semester hours of upper division courses including philosophy of being, philosophy of man, natural theology, theory of knowledge, ethics, survey of systematic philosophy medieval philosophies and six hours in history of philosophy Tests qualifying examination may be required testing general background in systematic philosophy, familiarity with the writings of St Thomas his general philosophical position and his method, the history of ancient and medieval philosophy based on Zeller An Outline of the History of Ancient Philosophy and Gilson, A History of Christian Philosophy general acquaintance with the works of St Thomas Aquinas and his philosophical system acquaintance with the more important works of modern Thomistic philosophy Faculty 22 full time 49 graduate students enrolled

Physics Nuclear physics Beta and Gamma rays, spectroscopy slow neutron scattering solid state physics properties of semi-conductors photo-electric emission X ray and electron diffraction electron microscopy structure of thin films theoretical physics dirac equation, nuclear magnetic effects micro wave absorption field theory X ray microscopy Prerequisites courses in general physics college course in general chemistry courses in algebra geometry and trigonometry of high school grade working knowledge of differential and integral calculus before or during first year's work 18 semester hours of upper division courses in physics, including theoretical mechanics optics, electricity and magnetism atomic physics nuclear physics fundamental electronics Faculty 8 full time 32 graduate students enrolled

Physiology Central and peripheral circulation, blood coagulation, sympathetic nervous system, the regulation of body temperatures, micro

wave irradiation Prerequisites biology, chemistry physics Faculty 7 full time

Sociology Social theory and sociological synthesis social organization and demography, social psychology marriage and the family, social disorganization and problems social anthropology Prerequisites modern society and American social problems 9 semester hours of upper division courses from the following or their equivalents—science of sociology social psychology encyclicals sociological methods or statistics, the remaining nine credit hours may be accepted from courses in economics ethics psychology, sociology or social work Faculty 4 full time, 2 part time 29 graduate students enrolled

St Mary's College

NOTRE DAME INDIANA

School of Theology

Established 1944 Purpose is to give religious teachers (as Catholics in the lay apostolate) opportunity to participate in the treasury of sacred doctrine handed down by the great doctors of the Church. Its religious authorization is under the direction of the Chairman of the Episcopal Commission on the Confraternity of Christian Doctrine and the full approbation of the bishop of the local diocese

Full participation in activities provided by the College and the University of Notre Dame

Women Functions under charter of St. Mary's College granted by State of Indiana in 1853 Summer courses 6 Ph.D.s awarded in 1956-7

Resident facilities for religious women on campus for others in South Bend

Residence requirements for doctorate two years and three summer sessions

ADMISSION REQUIREMENTS

BA provided a sufficient philosophical background is part of undergraduate preparation. Arrangements made for students with insufficient background to register in undergraduate courses at St Mary's College

Latin required

Apply to Dean School of Theology

FEES AND FIRST YEAR AID

Tuition—\$270 Room and board \$600 yearly
Four scholarships, also reduction or cancellation of tuition

FIELDS OF STUDY FOR THE PH D

Sacred Theology Dogmatic and moral theology, sacred Scripture, church history Faculty 6 full time, 3 part time 16 graduate students enrolled

NOTES

At end of first semester student pursues a research problem under the direction of a professor, for the remainder of the graduate program

Smith College

NORTHAMPTON, MASSACHUSETTS

Committee on Graduate Study of Smith College

The graduate program is concentrated on the first year of study, student being awarded the M A In education and physical education the Master of Education and Master of Science in Physical Education degrees are awarded Although there are about 100 students, only occasionally is a Ph D awarded, in the last decade Ph D s were awarded in chemistry botany and genetics, English, and philosophy

The first M A s and Ph D s were awarded in 1882, seven years after the establishment of the College Male students have occasionally been awarded degrees Graduates usually go into teaching and research activities many proceeding in advanced studies toward the Ph D at other institutions

There are two graduate dormitories housing about 50 students Unusual collections in music and art Strong teaching fellowship program a nursery, a day school. Affiliated with Clarke School for the Deaf

Occasional evening courses as graduate seminars, students usually women

Residence requirement for the doctorate three years of study, with at least one year in residence one year at another institution

The Committee on Graduate Study administers the program and is not separated from the College

ADMISSION REQUIREMENTS

Students of honor calibre possessing a baccalaureate degree If the undergraduate major is not equivalent to that at Smith, the prerequisite courses to advanced study must also be taken in an extra semester or year One modern language in student's field of specialization GRE is desirable

Apply before June 1 to the Committee on Graduate Study

FEES AND FIRST YEAR AID

Tuition—\$550 plus fee for diploma Room and board \$800

Fellowships available at \$1000 to \$1350 scholarships of \$350, teaching fellowships at \$1400 plus tuition loan fund for tuition charges Apply before March 1 to Committee on Graduate Study

University of South Carolina

COLUMBIA SOUTH CAROLINA

Graduate School

Present doctoral program was organized in 1923 but discontinued with the depression in 1933 then reorganized in 1944

Colonial and State archives Nearby are atomic energy installations at Savannah River project where properly cleared students may enjoy special advantages

Men and women under State's racial regulations Limited summer courses 4 Ph D s awarded in 1956 7

Residence requirements for doctorate three years beyond baccalaureate degree, at least one year in residence

Transfer students must furnish letters of recommendation and master's thesis, also GRE scores

ADMISSION REQUIREMENTS

Standard baccalaureate degree substantiated by GRE Letters of recommendation from in

structors required by most departments. Copies of master's degree thesis or comparable research work.

Two modern foreign languages, one of which must be French or German, required in all fields except professional education, which requires only one modern foreign language.

Admission examination in all fields, also Advanced and Aptitude Tests of GRE. Previous teaching experience in Professional Education.

Apply to Graduate School at least 30 days before opening of session.

FEES AND FIRST YEAR AID

Tuition and Fees—In state approx. \$100 per semester, out of state approx. \$185 per semester. Room men \$35 per semester, women same.

Fellowships and assistantships from \$750 to \$2,000 per year with reduction of fees. Apply to Graduate Office before March 15.

FIELDS OF STUDY FOR THE PH D

Biology College teaching stressed. Prerequisites: undergraduate major with 35 semester hours in biology and 8 hours of chemistry, master's degree in biology, or in some cases chemistry. Combined program with chemistry. Faculty 9 full time. 14 graduate students enrolled.

Chemistry Physical and organic. Prerequisites: a college year each of general, analytical or organic, and physical chemistry, a year of physics and mathematics through calculus, then a master's degree with suitable thesis—this to include at least one course in organic, physical, inorganic and analytical chemistry on graduate level. Combined program with biology. Faculty 9 full time. 22 graduate students enrolled.

Education Elementary education, secondary education, school administration, guidance service. Prerequisites: undergraduate major, master's degree, letters of recommendation, GRE, one modern foreign language.

English Modern English literature, American literature. Prerequisites: undergraduate major in literature, master's degree with thesis in the field accompanied with adequate recommendations. A Southern culture program is offered in connection with Department of History. Faculty 21 full time. 25 graduate students enrolled.

History Modern European, United States, diplomatic history. Prerequisites: undergraduate major in history, master's degree with thesis ap-

propriate letters of recommendation. Faculty 14 full time. 28 graduate students enrolled.

NOTES

Departments regularly require that students serve at least one year as a departmental assistant under the direction of a senior professor.

University of Southern California

LOS ANGELES 7, CALIFORNIA

The Graduate School

In 1910 a Graduate Department was organized in the College of Letters, Arts, and Sciences. The year 1920 saw the beginning of a Graduate School of Arts and Sciences, and three years later this became the Graduate School of the University. A Council on Graduate Studies coordinates graduate work throughout the University. This group is composed of the President of the University (chairman), Dean of the Graduate School (vice chairman), directors and deans of the various schools, and seven faculty members appointed by the President.

Ed D., D.P.A., D.S.W. and D.M.A. given by allied divisions.

The Allan Hancock Foundation, which does research in marine biology, provides for publication of research studies conducted under its auspices: seven publications including Abstracts of Dissertations, University Housing Bureau on campus supplies all residence information.

Men and women. Private control. Summer and evening courses. 111 Ph.D.s awarded in 1956-7.

Residence requirement for doctorate: a minimum of three years of academic work, at least one year of course work must be done in residence at the University.

ADMISSION REQUIREMENTS

Applicants must present evidence of (1) sound health, (2) good moral character, including responsible citizenship, and (3) intellectual promise that indicates ability to do acceptable

university work. A strong academic record is of extreme importance.

French and German required for doctorate.
GRE (Area and Aptitude), departmental tests.

Apply to Office of Admissions at least 6 weeks prior to term.

FEEES AND FIRST-YEAR AID

Tuition—same for in state and out of state residents.

A limited number of scholarships are available. Apply at the Graduate School by March 1.

FIELDS OF STUDY FOR THE PH D

Anatomy The School of Medicine offers graduate curricula in the basic science departments (anatomy, biochemistry and nutrition, medical microbiology, pharmacology, toxicology, and physiology) leading to the Ph D. Prerequisites: courses included in the curriculum of the first two years of the medical course. Faculty: 6 full time, 9 part time. 3 graduate students enrolled.

Bacteriology General bacteriology with research in food, industrial or soil bacteriology, or bacterial cytology, physiology, biochemistry, clinical bacteriology, immunology, and serology. Prerequisites: undergraduate major in bacteriology, or its equivalent, sound background in chemistry. For specifics see catalog. Faculty: 4 full time, 12 part time. 41 graduate students enrolled.

Biochemistry and Nutrition Prerequisites: 18 units of upper division work in chemistry and biological sciences, including quantitative analysis, 8 units of organic chemistry, based on approximately 8 units each of lower division mathematics, through integral calculus, physics, and biology, GPA of 2.75, biochemistry courses are required but may be counted toward the degree. Russian can be an alternative for French, background examination. See catalog. Faculty: 6 full time, 1 part time. 41 graduate students enrolled.

Biology Botany—atomy and development, morphology, systematics and ecology, plant physiology, zoology—marine invertebrates, freshwater invertebrates, parasitology, vertebrate biology, physiology, ecology, genetics and cytology. Combined program with Botany and Zoology. Prerequisites: GRE advanced test in biology, B average in previous biology course work. Faculty: 10 full time, 5 part time. 70 graduate students enrolled.

Chemical Engineering Prerequisites: candidate must demonstrate proficiency in the following fields of specialization in chemical engineering—thermodynamics, kinetics, mass transfer operations, and heat transfer and fluid flow. Research work may be done in any of the above fields. Faculty: 4 full time, 3 part time. 32 graduate students enrolled.

Chemistry Advanced work in inorganic, analytical, organic, and physical chemistry, and in divisions of these four basic branches. Prerequisites: a complete undergraduate major in chemistry, including inorganic, analytical, organic, and physical chemistry, satisfactory performance on tests covering these areas. Recommended: course work may be chosen from the following departments outside Chemistry—Bacteriology, Biochemistry, Biology, Chemical Engineering, Geology, Mathematics, Petroleum Engineering, Pharmacology, Physics. Faculty: 17 full time, 20 part time. 57 graduate students enrolled.

Communications Telecommunications, speech, drama, cinema. Combined program with drama and cinema. Prerequisites: 18 upper division units including at least one course each in 3 of the 4 departments of the division (cinema, drama, journalism, speech, telecommunication), and at least 10 units in the department of emphasis. Faculty: 13 full time, 22 part time. 180 graduate students enrolled.

Comparative Literature Greek and Latin literature, knowledge of a development of a movement, and special familiarity with a certain period and with one genre. Prerequisites: the following or their equivalent—masterpieces of world literature, general linguistics, Shakespeare and the Elizabethan drama, history of French literature, history of German literature, Goethe, classical literature in translation, American literature, Russian literature. Specialized courses are assigned in harmony with the student's field of concentration. Student must have an acquaintance with the leading bibliographical material in his special field. Faculty: 1 full time, 6 part time. 22 graduate students enrolled.

Economics Economic theory and history of economic thought (required of all candidates), money and credit and credit institutions, economic history, public finance and taxation, public utilities, labor economics, land economics and conservation, national economic planning and regulation, international economic relations, con-

summer economics, economics of growth and development. Prerequisites background in mathematics and statistics Faculty 9 full time, 5 part time 60 graduate students enrolled.

Education Administration and supervision, audio-visual, business, fine arts guidance, history and philosophy music, physical education psychology, secondary and higher, teacher training Prerequisites in addition to adequate undergraduate preparation including 18 upper division units in the major field, at least 40 units of graduate course work in major department, minimum GPA of 3 for all graduate work Ed.D. also awarded in this field Faculty 24 full time, 38 part time 1500 graduate students enrolled

Electrical Engineering Circuit analysis and synthesis communication theory, computers and controls electromagnetic engineering, electronics and electron devices, electromechanical systems power and machinery Faculty 12 full time, 36 part time 307 graduate students enrolled

Engineering Mechanical and general engineering Faculty 35 full time, 70 part time 400 graduate students enrolled

English A candidate is expected to have a knowledge of history of English and American literature in all periods and types and of growth and structure of the English language, creditable skill and correctness in speaking and writing, specific firsthand familiarity with significant works in English, a knowledge of scholarly and critical methods and resources and ability to use them with insight and sound judgment. Faculty 22 full time 12 part time 60 graduate students enrolled

French French and French literature Prerequisites all candidates must have work in survey of French literature courses in French literature of the 17th century and 18th or 19th century, in French syntax, and in French phonetics Recommended reading knowledge of Spanish, Italian, Latin and German Faculty 5 full time, 4 part time 19 graduate students enrolled

Geology Ground water, economic geology, mineralogy paleontology micropaleontology, petroleum geology, petrology, physiography, stratigraphy, sedimentation, structural geology, and marine geology Faculty 7 full time, 20 graduate students enrolled.

German German and German literature. A reading examination in another language must be passed Faculty 5 full time, 5 part time 12

graduate students enrolled

History Faculty 11 full time, 14 part time 65 graduate students

Mathematics Algebra, geometry, number theory, analysis, topology, applied mathematics, and mathematical logic Prerequisite substantial undergraduate major Qualifying examination consists of oral and written tests in each of the following fields algebra, analysis, and geometry (including topology) Faculty 13 full time, 17 part time 40 graduate students enrolled

Medical Microbiology Most of the courses included in the curriculum of the first two years of the medical course are accepted by the Graduate School for credit Properly qualified students may undertake special work in the basic science departments leading to the Ph.D.—anatomy, biochemistry and nutrition, medical microbiology, pharmacology and toxicology and physiology Faculty 4 full time, 2 part time 3 graduate students enrolled.

Music Musicology Prerequisites A.B. with major in music, and a satisfactory score on the Music Graduate Entrant Examination and GRE Application for candidacy will be approved by the Dean of the School of Music only after a minimum of a semester of successful graduate study for the degree Candidates may concentrate only in musicology, for which a substantial background in comparative literature history, and aesthetics is required D.M.A. also offered in this field Faculty 25 full time, 26 part time 140 graduate students enrolled

Pharmacology and Toxicology Most of the courses included in the curriculum of the first two years of the medical course are accepted by the Graduate School for credit Properly qualified students may take special work in the basic science departments leading to the Ph.D. Faculty 7 full time, 1 part time 4 graduate students enrolled.

Pharmacy Pharmaceutical chemistry, pharmacognosy pharmacology and pharmacy Students holding the M.S. or the degree of Doctor of Pharmacy with a B average, and having demonstrated ability for research, may become candidates for the Ph.D. Doctor of Pharmacy also awarded in this field. Faculty 8 full time, 8 part time 28 graduate students enrolled

Philosophy History of philosophy, epistemology, metaphysics, logic, ethics, aesthetics, and the philosophy of science. Prerequisites history

of philosophy (ancient, medieval, modern), full undergraduate major in philosophy, high GPA. A fairly facile knowledge of the classical languages would be profitable for research work. Faculty 7 full time, 1 part time. 26 graduate students enrolled.

Physical Education Health education, recreation. Faculty 14 full time, 17 part time. 84 graduate students enrolled.

Physics Student will be expected to provide himself with the preparation needed for an understanding of all branches of modern physics. Faculty 9 full time, 11 part time. 32 graduate students enrolled.

Physiology Special work is done in the basic science departments. Prerequisites: courses included in the curriculum of the first two years of the medical course. Faculty 5 full time, 5 part time. 23 graduate students enrolled.

Political Science Political theory, comparative government, public administration, public law, American government, political parties, public opinion and political dynamics, and international relations. Combined program with International Relations Department offered. See catalog for prerequisites. Faculty 6 full time, 6 part time. 20 graduate students enrolled.

Psychology Clinical psychology, including vocational adjustment problems, theoretical and experimental psychology, including sensation and perception, motivation, emotions, learning, physiological psychology, experimental psychopathology, business and industrial psychology, including selection, evaluation, and training of employees, public opinion polling and attitude studies, psychological aspects of marketing research, psychological measurement, construction and validations of psychological tests, item analysis, factorial analysis. Prerequisites: an undergraduate major in psychology, or its equivalent, including various courses, see catalog. Ph.D. requires two years beyond M.A., an additional year is required for students specializing in clinical psychology. Faculty 11 full time, 15 part time. 100 graduate students enrolled.

Religion School of Religion, separate from the University, is now being reorganized (1957). Student should confer with the Dean of the Graduate School.

Sociology Historical and theoretical sociology, social psychology, research methodology, social organization and disorganization, marriage coun-

seling and family life education. Prerequisites: see catalog. Faculty 9 full time, 5 part time. 77 graduate students enrolled.

Spanish and Italian Spanish and Spanish American literature and culture. Student must have mastery of the language and a knowledge of the history, development, and modern usage of the language. He must be able to conduct independent advanced research in the field of Hispanic literature or linguistics. Faculty 5 full time, 5 part time. 3 graduate students enrolled.

Speech General speech (public address), speech and hearing pathology, and oral interpretation. Combined program with Communications Department offered. Prerequisites: communication course. Faculty 9 full time, 2 part time. 50 graduate students enrolled.

NOTES

Among the courses in education offered by the University are: Problems of College Teaching, Advanced Methods of Adult Education, Higher Education in the United States, and Junior College Education.

Stanford University

STANFORD, CALIFORNIA

Graduate Division

The University was opened in 1891, and the first Ph.D. was conferred in 1894.

Allied divisions offering the doctorate: Graduate School of Business, Ph.D.; School of Education, Ed.D. and Ph.D.; School of Engineering, Ph.D.; Food Research Institute, Ph.D.; School of Humanities and Sciences, Ph.D.; School of Law, J.S.D.; School of Medicine, M.D. and Ph.D.; School of Mineral Sciences, Ph.D.

Facilities include an applied electronics laboratory, applied mathematics and statistics laboratory, W. W. Hansen Laboratories of Physics, Hoover Institution on War, Revolution, and Peace, marine station at Pacific Grove, Cal., natural history museum, electronics laboratories, Leland Stanford Junior Museum, music center, art gallery. Residence facilities available for both men and women, including some apartments for married veterans.

Men and women Summer courses, a few special evening courses 131 Ph.D's awarded in 1956-7

General requirements for Ph.D. include minimum of three years of graduate study at least one of these years and the final units of credit as a registered student at Stanford University Reading knowledge of two foreign languages (or one foreign language and a program of at least fifteen quarter units in separate but allied field) oral examination, dissertation Candidacy for University Ph.D. must be approved by University Committee on Graduate Study

ADMISSION REQUIREMENTS

Graduation from undergraduate college of recognized standing with credentials indicating ability and promise and with intent to pursue program leading to advanced degree Admission with graduate standing does not necessarily imply admission to candidacy for an advanced degree Applicants must satisfy requirements of specific school or department as well as general admission requirements

Application on form provided by University, official transcripts of all previous college work official verification of degrees received, three statements of personal qualifications from instructors and others qualified to report on candidate Graduate School of Business School of Law, and School of Medicine require an additional application form.

Apply to Office of Admissions by August 15 for Autumn Quarter, December 1 Winter Quarter March 1 Spring Quarter June 1 Summer Quarter Exceptions to date for Autumn Quarter Graduate School of Business June 1, School of Medicine, December 1 of previous year Physics Department February 15, Psychology Department June 1

FEES AND FIRST YEAR AID

Application—\$5.00 Tuition—\$750 regular Graduate School of Business—\$900 School of Medicine—\$1005 Room for men—\$138 to \$300 board—\$495 Room and board for women—\$750 These charges are for an academic year of three quarters

Application forms for fellowships may be obtained from the Office of Admissions and are to be filed on or before February 15 with the Committee on Financial Awards No applications con-

sidered before complete admissions data have been filed

Graduate School of Business

Program designed for those preparing for teaching in institutions of higher learning or for technical research in business The student must demonstrate a high degree of competence in at least four fields of business ordinarily selected from accounting business and government, business statistics finance and banking industrial management, marketing personnel and industrial relations and transportation Student must also have minor under jurisdiction of a department outside the Graduate School of Business or a coordinated program of nonbusiness courses totaling at least 30 quarter units of graduate quality

School of Education

Ph.D. program designed for students preparing for research work in public school systems or specialized institutions or in connection with college teaching Forty five of the requisite 135 quarter units beyond the baccalaureate must be in minor field if student does not hold a master's degree outside field of education

School of Engineering

Aeronautical Engineering Division Aerodynamics aircraft structures and aircraft power plants

Civil Engineering Department The first year is represented by the M.S. program Fields include structural engineering and hydraulic engineering

Electrical Engineering Department Qualifying examinations given at beginning of second year of graduate study reading examination usually in French or German About one fourth of the graduate program should be in other departments and will usually include advanced calculus and introduction to theoretical physics A formal minor may be elected The Ph.D. may also be conferred in Electrical Engineering Electronic Science

Engineering Mechanics Division The Division

offers advanced study in applied solid and fluid mechanics, leading toward careers in research or college teaching. The first year is represented by the MS program. Qualifying oral examinations early in second year, reading examination in at least one foreign language, usually German.

Industrial Engineering Department The first year is represented by the MS program.

Mechanical Engineering Department In lieu of a second foreign language a group of courses centering around an additional field of competence may be offered.

Food Research Institute

The program, designed as preparation for a career in research, gives an important place to theoretical economic analysis, but it emphasizes empirical investigation of economic aspects of food and agriculture. Candidate for degree must demonstrate proficiency in four fields of study, a minor in statistics or economics, or courses outside the Institute to supplement candidate's work on dissertation or on major fields of study, participation in weekly staff seminars. Two of the three to four years required for doctorate must be spent at the Institute.

Graduate Division Special Programs

Provided for the unusually well qualified student whose plans do not fall within the province of any one department. The student's advisory committee must include professors from at least two departments. The committee will address a Declaration of Intention to the University Committee on Graduate Study defining the area of the special program, outlining the program of study and research, and indicating the nature of the dissertation. The committee will supervise the student's work, with the chairman normally directing the dissertation.

School of Humanities and Sciences

Anthropology For candidates intending to specialize in cultural anthropology, though a general competence in other phases of anthropology is also required, physical anthropology, prehis-

toric archaeology, and linguistics. The program ordinarily consists of (a) History and Modern Viewpoints four areas of specialization and at least 15 quarter units of graduate work in some other department the work to be related to the elected fields of specialization, or (b) History and Modern Viewpoints, three areas of specialization, and a minor.

Art and Architecture Doctoral program not offered.

Asiatic and Slavic Studies Doctoral program not offered.

Biological Sciences Prerequisites: advanced courses in biology, one year of general inorganic chemistry, a course in organic chemistry, and four additional quarter units in physical sciences. Qualifying examination not later than the fourth graduate quarter. Work may be carried on in campus biological laboratories or at Hopkins Marine Station in Pacific Grove. Courses and research in botany, entomology, and zoology of interest at the Natural History Museum at Stanford.

Chemistry and Chemical Engineering Requirements for degree—average of at least B in graduate course work, qualifying examination not later than second graduate year. For students other than those majoring in biochemistry or chemical engineering, examination will be in inorganic, analytical, organic, and physical chemistry. For students majoring in chemical engineering, examinations will be in general engineering, basic chemical engineering, physical chemistry, and any of three remaining chemistry examinations. For students majoring in biochemistry one of the examinations will be in organic chemistry, the remaining three selected from inorganic, analytical, and physical chemistry, microbiology or physiology.

Classes Doctoral program not offered.

Communication and Journalism The program, under the Graduate Division Special Programs (see above), is designed to train students for research in mass communications. It includes courses in several departments which offer work in statistics, learning, perception, social psychology, social organization, social structure and the methodology of the behavioral sciences.

Economics Requirements for candidacy—recommendation by departmental committee on basis of quality of course work and oral examination (usually offered in third quarter of gradu-

ate study), completion of University foreign language requirement. For degree, student must qualify in six specific fields of study, upon which he will be tested in written examinations and in two other selected fields.

English Reading knowledge of Latin, German, and French second foreign language examination must be passed before registering for fifth quarter. All languages passed before written comprehensives. Candidates may specialize in English literature or English philology. Course in Old and Middle English must be taken at Stanford or passed by examination. A minor must be offered in related department, or supplementary program of at least 24 quarter units in English literature, English philology, or American literature, or a special program of studies related to the projected research. Department also participates in Graduate Honors Program in Humanities (see below).

Geography Students with superior qualifications may work for degree in Graduate Division Special Programs (see above).

Germanic and Romanic Languages Major in French, German or Spanish. Minor recommended but not required. Candidates majoring in Spanish may minor in Hispanic American Studies. Prerequisite for candidacy equivalent of master's degree. All candidates specialize in either Linguistics or Literature. Department participates in Graduate Honors Program in Humanities (see below).

Graduate Honors Program in the Humanities A program supplementing the doctoral programs in English, Germanic and Romanic Languages, History, Philosophy, Speech and Drama, with an interdepartmental concentration on the study of the Western tradition as a whole. In general, candidates may apply for entrance to the program after one year of graduate study at Stanford or elsewhere, although exceptional students may be admitted at beginning of graduate work. The Ph.D. is a joint degree with cooperating department, and candidate must complete course requirements of program and department. One ancient and one modern foreign language required, written comprehensive and oral examinations.

Hispanic American Studies Concerned with culture of Spain, Portugal, and Latin America administered under Graduate Division Special Programs (see above).

History Professional training for careers in teaching and research, field to be selected from European, British, United States, Latin American history or history of Far East.

Mathematics To be admitted to candidacy, student must have completed certain prescribed courses in field together with 24 additional quarter units of graduate courses, have demonstrated ability to read French or German, and have passed departmental oral examination. Requirements for degree include grades of B or better in course work.

Music A limited number of students with superior qualifications admitted to candidacy for Ph.D. in cooperation with School of Education, department offers work leading to degree of Ed.D. with concentration in music. Under this program the student normally takes about one third of his work in education and two thirds in music.

Philosophy Prospective candidates must pass written examinations in ethics and theory of value, epistemology and metaphysics, history of philosophy, logic and scientific method, aptitude and advanced test, GRE. Department participates in Graduate Honors Program in Humanities.

Physics The number of graduate students is strictly limited, applications due by February 15. Degree may be obtained either in physics or in applied physics. Candidate required to pass written examination preliminary to oral, German, French, and Russian are the acceptable languages, specific course requirements.

Political Science Training preparatory to careers in government, research, teaching, or private enterprise where knowledge of domestic politics and foreign affairs are in demand. Reading knowledge of two modern languages, normally French and German, written examination in each of candidate's four fields and departmental oral examination before candidate is recommended for University oral.

Psychology Admission to both clinical and nonclinical training programs strictly limited, GRE required, application by June 1. Nine hour written examination in one of the major areas (clinical, counseling, departmental, social and personality, physiological and comparative, perception and learning, psychometrics). A minor is required, or 12 quarter units outside the department and a written examination in a second area of psychology. French and German are the

preferred foreign languages

Sociology For admission to candidacy student must show in brief oral examination early in second year his ability and preparedness to pursue advanced work, he must also demonstrate before end of second year his knowledge of two foreign languages, or one language plus 15 quarter units in an external field. Two courses in statistics are required. Comprehensive written examinations in candidate's selected fields before eligible for University oral. Candidate must become familiar with field of History and Modern Viewpoints and at least three other fields.

Speech and Drama Prospective candidate may plan program with concentration in either theater and drama or rhetoric and public address with primary emphasis upon training for research. Department participates in Graduate Honors Program in Humanities (see above).

Statistics Program must include work in pure mathematics, mathematical statistics, and application of statistics to a particular field. Requirements include a minor in field outside jurisdiction of department and a six hour written examination in statistics.

School of Medicine

The Ph.D. is offered in the Departments of Anatomy, Medical Microbiology, Pharmacology, and Physiology, with individual programs worked out for each candidate.

The program at the doctoral level in the Division of Speech Pathology and Audiology prepares student for Advanced Certification in The American Speech and Hearing Association. He may specialize in speech pathology, audiology, or speech sciences, but he is expected to acquire a substantial background in the other two as well. Normally a minor is included in the doctoral program, departmental written and oral examinations precede the University oral examination.

School of Mineral Sciences

Ph.D. available in geology, geophysics, metallurgical engineering, mineral engineering, petroleum engineering. Candidate must be able to read German and one other foreign language, pass

departmental oral examination, meet requirements of minor department, if minor is elected, demonstrate ability at independent investigation and present results of such research.

Stevens Institute of Technology

HOBOKEN, NEW JERSEY

Stevens Graduate Studies Program

Founded in 1870, Stevens Institute granted the Ph.D. in chemistry quite early in its history, although records do not indicate that these were comparable to present graduate level degrees. Graduate programs leading to the M.S. degree were started in 1930. The first doctoral program was instituted in 1951, leading to the Sc.D. in applied mechanics. The Ph.D. degree has been offered since 1955. Although the graduate program began as a separate school reporting to the President, it was reorganized in 1952 and incorporated in the administration of the Institute.

Experimental towing tank laboratory for ship models and seaplanes, powder metallurgy laboratory, general facilities in physics, chemistry, and mechanical engineering for theoretical and experimental work, including Collins Cyrostat, infra red spectroscopy, etc.

Men only. Nearly all graduate courses offered in evening starting at 6:30 p.m.

Residence requirement for doctorate: minimum of one year of residence (with student expected to spend a substantial portion of each week on campus during the day).

ADMISSION REQUIREMENTS

Admission by correspondence with Director of Admissions requiring two copies of official transcript of undergraduate and other graduate school records, letter of recommendation from previous faculty member, admission application. Student generally expected to stand in upper third of undergraduate class. For degree, reading knowledge of technical German and one additional language in certain departments. Qualifying examinations may be required by certain departments.

Applications may be received at any time,

though it is desirable for doctoral candidates to begin classes in the Fall term.

FEES AND FIRST YEAR AID

Tuition—\$36 per credit hour \$5 registration fee, laboratory fees as per catalogue

Graduate assistantships, research assistantships and some fellowships For assistantships apply to department, for fellowships, apply to Graduate Dean

FIELDS OF STUDY FOR THE PH D

Programs leading to the Ph.D degree in physics chemistry, and mathematics Total faculty full time, 104, part time 34

Syracuse University

SYRACUSE NEW YORK

The Graduate School

University was founded in 1870 Graduate courses were first organized in 1874 Administration remained with a faculty committee until 1912, when the Graduate School became one of the formally organized units of the University The School is the central unit for the over all administration of graduate work, except for professional programs in law and education

Allied divisions offering doctoral degrees are School of Education, Ed D., State University of New York, College of Forestry, Ph.D.

The D.S.S. and D.P.A., as well as the Ph.D., are offered through the Graduate School

Apartment for graduate men, for graduate women and married students Graduate School of Citizenship and Public Affairs, Graduate School of Education New York State College of Forestry College of Law Research Institute. Centers psychological research, hearing and speech, computer and art Educational film library Museum of Natural Science Observatory Radio station Isotope laboratory

Men and women. Private control. Summer and evening courses 81 Ph.D.s awarded in 1956-7

Acceptance of transfer credit is at discretion of student's department and the Dean

ADMISSION REQUIREMENTS

Graduation from 4 year accredited college, command of prerequisite areas, evidence of aptitude for high level scholarship, two transcripts, three letters of recommendation

GRE, MAT, or CAVD required by some departments Recommended GRE, MAT or CAVD languages

Apply to Dean of Graduate School, preferably before May 15, for Summer or September admission

FEES AND FIRST YEAR AID

Tuition—\$30 per credit hour, \$45 in a few high cost fields Room—men \$224 to \$480 per academic year, women \$8 to \$10 per week. Board—\$220 per semester

Applicants for first year aid may compete for scholarships and fellowships ranging from \$500 to \$2,250 and for graduate assistantships from \$1,000 to \$3,300 In high tuition fields (\$45 per credit hour), partial scholarships are based on student needs Apply to the Dean of Graduate School before February 20

FIELDS OF STUDY FOR THE PH D

Audiology and Speech Pathology Speech and hearing therapy, education of deaf Prerequisites standards of American Speech and Hearing Assn., CAVD and MAT, interview Recommended practical experience in field, psychology, one modern foreign language, statistics Ed D., also offered in this field, administered by School of Education 49 graduate students enrolled

Bacteriology and Botany Bacteriology, botany, genetics, microbiology Combined program with science college teaching Prerequisites advanced undergraduate preparation in this field Recommended French German, statistics, chemistry 34 graduate students enrolled

Chemical Engineering Areas of concentration individually designed to meet special interest of student. Combined program with solid state science and technology Prerequisites advanced preparation in mathematics, physics, chemistry, chemical engineering Recommended two foreign languages 33 graduate students enrolled

Chemistry including Biochemistry Inorganic, organic, physical, analytical, bio-organic chemistry Combined programs with biochemistry, solid

state science and technology, and science teaching Prerequisites analytical, organic, and physical chemistry, general physics, mathematics through integral calculus Recommended scientific German, non specialized courses in humanities 49 graduate students enrolled

Economics Theory and method, labor, money and banking, public economy, organization, economic history, international economics Combined program with international relations Prerequisites advanced preparation in economics, basic knowledge in mathematics Recommended at least one foreign language, statistics, accounting D S S and D P A also awarded with major in this field Program administered by Graduate School of Citizenship and Public Affairs 45 graduate students enrolled

Education All standard areas of professional education Combined programs are offered with most subject matter and special personnel fields Prerequisites advanced preparation in proposed area of specialization, MAT and CAVD examinations, interview Recommended languages, statistics Ed D also awarded in this field Program administered by School of Education 1,168 graduate students enrolled

Electrical Engineering Individually designed to meet special interest of student Combined programs with solid state science and technology Prerequisites advanced preparation in mathematics physics electrical engineering Recommended two modern foreign languages 446 graduate students enrolled

English English literature and culture, American literature and culture Combined program humanities Ph D for college teaching Prerequisites advanced preparation in the stated field of English Recommended two modern foreign languages 48 graduate students enrolled

Geography General regional, cultural, and physical geography, field and research techniques Combined program with international relations Prerequisites advanced preparation in geography Recommended two foreign languages D S S also awarded with major in this field Program administered by Graduate School of Citizenship and Public Affairs 24 graduate students enrolled

Geology Designed to prepare for employment as a professional geologist Combined program with science college teaching Prerequisites mineralogy paleontology, geomorphology, structural

and field geology, college physics, chemistry, mathematics Recommended geological field experience, two modern foreign languages 14 graduate students enrolled

Germanic Languages and Literature Individually designed to meet special interest of student Combined program with humanities for college teaching Prerequisites advanced knowledge of Germanic literature, German Recommended Latin or Greek, and a modern foreign language other than German 2 graduate students enrolled

History Ancient, medieval, European English, Russian, the British Empire, American, Latin American Combined program with international relations Prerequisites advanced preparation in selected fields of history, basic knowledge in the social sciences Recommended two modern foreign languages, study in the humanities D S S also awarded with major in this field Program administered by Graduate School of Citizenship and Public Affairs 28 graduate students enrolled

Home Economics Family living and child development, food and nutrition Combined programs with home economics education Prerequisites advanced preparation in field of specialization Recommended two modern foreign languages 5 graduate students enrolled

Humanities for College Teaching Two fields within a traditional department of the humanities plus three synthetic fields which cut across boundaries of traditional departments Program designed to combine with special preparation in higher education work in two or more departments of the humanities Prerequisites advanced preparation in at least one field of the humanities Recommended two foreign languages 3 graduate students enrolled

International Relations Geographic concentration functional concentration Program is interdepartmental within School of Citizenship and Public Affairs Prerequisites advanced preparation in international relations, basic knowledge of the social sciences, knowledge of at least one modern foreign language Recommended two modern foreign languages 13 graduate students enrolled

Journalism Advertising, magazine practice newspaper practice, publishing Prerequisites advanced training in journalism. Recommended two modern foreign languages statistics 36 graduate students enrolled

Mathematics Algebra, geometry, analysis, statistics, computer programming. Combined program with science college teaching. Prerequisites equivalent of undergraduate major in mathematics. Recommended two foreign languages, physics. 23 graduate students enrolled.

Philosophy Logic, metaphysics, history of philosophy, ethics, social and political philosophy, philosophy of religion, aesthetics. Prerequisites: fundamental preparation in history of philosophy, logic, ethics. Recommended two modern foreign languages, wide acquaintance with the liberal arts and sciences. 4 graduate students enrolled.

Physics, including Bio physics Relativity, statistical mechanics, quantum field theory, elementary particles, solid state, high energy nuclear physics, molecular beams, surface phenomena, infra red spectroscopy, physical electronics. Combined programs with solid state science and technology, science college teaching. Recommended Russian, French, German, broad training in the humanities and social sciences. 81 graduate students enrolled.

Political Science Comparative government, informal phases of governance, juristic and political theory, international law and relations, public law, public administration. Combined program with international relations and public administration. Prerequisites: advanced preparation in political science, broad background in social sciences. Recommended two modern foreign languages, statistics. DSS and DPA also awarded with major in this field. Program administered by Graduate School of Citizenship and Public Affairs. 127 graduate students enrolled.

Psychology Clinical, experimental, physiological, social, testing and measurement, developmental, education. Combined program with education. Prerequisites: advanced undergraduate preparation in the field, MAT. Recommended two modern foreign languages, statistics. DEd, also awarded in this field, administered by Graduate Division, School of Education. 51 graduate students enrolled.

Romance Languages French, Spanish, Italian literature. Combined program with humanities for college teaching. Prerequisites: advanced knowledge of field of specialization and basic knowledge of a second Romance language. Recommended knowledge of German and Latin languages. 17 graduate students enrolled.

Science College Teaching Mathematics, chemistry, physics, bacteriology, botany, zoology. Program designed to combine with special preparation in higher education work in two or more departments of the sciences. Prerequisites: general background in sciences, advanced preparation in one science. Recommended one modern foreign language. 40 graduate students enrolled.

Sociology and Anthropology Theory and methodology, social organization, social psychology, deviant behavior, anthropology. Combined program with international relations. Prerequisites: advanced preparation in area of specialization, broad background in social sciences. Recommended at least one modern foreign language, statistics, mathematics. DSS also awarded with major in this field. Program administered by Graduate School of Citizenship and Public Affairs. 11 graduate students enrolled.

Solid State Science and Technology Mechanics, crystallography, theory of solids, electronics, metallurgy, thermodynamics, elasticity, plasticity, heat transfer, chemical kinetics, phase rule. This program combines work in chemistry, physics, mathematics and engineering, with specific emphasis on solid state technology. Prerequisites: advanced preparation in physical, engineering, or mathematical sciences. Recommended two modern foreign languages. 5 graduate students enrolled.

Zoology Physiology, endocrinology, parasitology, protozoology, cytogenetics, embryology. Combined programs with science college teaching, biochemistry. Prerequisites: broad training in biology and related sciences, particularly chemistry. 23 graduate students enrolled.

NOTES

Three programs are specifically designed for training college teachers, one each in the humanities, the sciences, and the social sciences. Emphasis is placed on training for breadth and orientation to the teaching profession.

Temple University

PHILADELPHIA, PENNSYLVANIA

Graduate Council

The Graduate Council was organized in 1946. It is responsible for all programs of study lead

ing to the Ph D in the University The first programs of study were authorized in 1947, and the first student graduated in 1950

Allied schools of the University offering other degrees are Teachers College, Ed D, School of Theology, S T D, School of Medicine, M D, School of Dentistry, D D S, School of Chiroprody, D S C.

In the Philadelphia area are many fine libraries, research institutes, museums and industrial organizations The Sullivan Library of the University has contemporary publications in all fields of study in which the Ph D is offered 16 Ph D s awarded in 1956-7

Residence requirement for the doctorate a minimum of three years of full time graduate study, at least two years of which are in residence at the University

ADMISSION REQUIREMENTS

Admission limited to graduates of schools listed in one of the Regional Associations of Colleges and Universities, except in special instances when an applicant may be admitted through a qualifying examination All departments, except those in the basic medical sciences, require that the scope of the applicant's preparation be substantially equivalent to the program of undergraduate training available at this University

Credit for work done at other institutions may be transferred at the discretion of the Graduate Study Committee, but in no instance shall it exceed 24 semester hours

FEES AND FIRST YEAR AID

Tuition—\$650 a year Room—\$250 for men, \$750 for women (including board) Board for men—approximately \$400

Teaching fellowships available in all departments, also other fellowships and scholarships

FIELDS OF STUDY FOR THE PH D

Anatomy Gross, microscopic, developmental, and neural anatomy Prerequisites of the 12 semester hours in biology required for admission, eight must be in zoological subjects Faculty 8 full time

Chemistry Organic, physical, inorganic, and analytical chemistry, bio chemistry Prerequisites general, organic, and physical chemistry, qualitative and quantitative analysis, 1 year of advanced chemistry, physics, differential and integral calculus, German and French (Russian, Japanese, or Italian may be substituted for French), GRE

Faculty 7 full time, 2 part time 41 graduate students enrolled

Microbiology Virology, intestinal microbiology Prerequisites medical microbiology, physiological chemistry, microbiology seminar, graduate symposium, basic science seminar, pathology, biochemistry, public health and preventative medicine, hematology Recommended advanced immunology, physiology Faculty 5 full time, 1 part time 2 graduate students enrolled

Pharmacology Prerequisites equivalent to bachelor's degree, mathematics, inorganic and organic chemistry, physics, biology, English, language, qualifying examination, if indicated, references Recommended analytical chemistry, physical chemistry, humanities Faculty 7 full time

Pharmacy Pharmacy, pharmaceutical chemistry, pharmacology Students will be required to take some courses in the College of Liberal Arts of this University Program to be activated in 1958 Prerequisites bachelor's degree in pharmacy, satisfying performance in qualifying examination given at School of Pharmacy, GRE may be required

Physics Acoustics, ultrasonics, solid state, X ray diffraction, nuclear and magnetohydrodynamics Prerequisites bachelor's degree with major in physics, better than C average, GRE may be required Faculty 7 full time, 4 part time 34 graduate students enrolled

Physiological Chemistry Allergens, electrophoresis, tissue permeability, histidine metabolism Prerequisites as stated in Bulletin, usually German and French Faculty 5 full time 5 graduate students enrolled

Physiology Cardiovascular physiology Prerequisites 12 semester hours of biology, chemistry, 6 each of English, foreign languages, mathematics, and physics, medical aptitude test Program administered by School of Medicine Faculty 7 full time, 1 part time 2 graduate students enrolled

Psychology Clinical and counseling psychology, psychology of reading, the general field Prerequisites master's degree in psychology, course program in undergraduate and first year studies similar to that outlined for the M.A. in psychology at this University, satisfactory rating in GRE Applicants must be mature, productive well adjusted Program administered by Teachers College Faculty 18 full time, 10 part time 40 graduate students enrolled

The University of Tennessee

KNOXVILLE TENNESSEE

The Graduate School

Established in 1879, although graduate study was first instituted in 1872 Ph.D. was first conferred in 1886 Doctoral program was discontinued in 1889 In 1932 the Medical School awarded its first Ph.D. In 1944 a doctoral program was again inaugurated at the Knoxville campus

Allied divisions offering doctoral degrees School of Biological Sciences at Memphis, Tenn.—Doctor of Philosophy in anatomy, bacteriology, chemistry pathology, pharmacology, and physiology, Oak Ridge Branch of the University—Doctor of Philosophy in chemical engineering, chemistry, mathematics metallurgy, and physics

Graduate program includes arrangements whereby opportunities for graduate study in certain fields include advantages of the social, natural, and industrial laboratories in Tennessee and its contiguous area Provision is made for field studies and research in geology, education (Ed.D.) engineering, the sciences, and political science In addition to the graduate programs in the Knoxville and Memphis branches of the University a graduate program is conducted in cooperation with, and as a part of the Oak Ridge Institute of Nuclear Studies broader program which has as its principal purpose the advancement of knowledge in nuclear science and the development of highly trained scientific and technical personnel in this and related fields All of these programs are conducted within provisions of the Institute's contract with the U.S. Atomic Energy Commission.

Men and women. Consideration is given to Negro Tennessee residents Summer and evening courses. 36 Ph.D.'s awarded in 1956-7

Residence requirements for doctorate one academic year or three consecutive quarters (normally the last year) of the required term of study must be in residence at the University

Normally, one year of post bachelor's course work from an acceptable institution may be transferred.

ADMISSION REQUIREMENTS

Degree(s) granted by accredited institutions,

provided the scope and quality of applicant's academic record are acceptable to the department concerned and are approved by the Dean of the Graduate School

Ph.D. candidates must possess a reading knowledge of two languages (other than English) in which there exists a significant body of literature relevant to their major field of study No transfer of evidence of language proficiency shall be accepted from another institution

MAT required in Psychology Department GRE recommended

Apply to Graduate School Office, application by April 15 for psychology

FEEES AND FIRST YEAR AID

Tuition—resident fee, \$53 per quarter, non resident fee, \$53 plus \$75 out-of state tuition per quarter Room—men \$35 to \$75 per quarter, women \$45 to \$75 per quarter Board—approximately \$110 per quarter

Loans will not be made to new students until after the opening of their second quarter of satisfactory work. A number of graduate assistantships and fellowships are offered through various departments Annual stipends range from \$800 to \$1,200 Apply for assistantships and fellowships before April 15 to head of the department in which the student expects to do his major study, for loans to University Treasurer's Office.

FIELDS OF STUDY FOR THE PH.D.

Bacteriology Bacterial physiology and metabolism, antibiotics, industrial fermentations, foods bacteriology pathogenic bacteriology, virology, immunology Prerequisites equivalent of courses required for M.S. in bacteriology, exclusive of thesis, French and German Recommended plant physiology, mycology, human physiology, parasitology physics, physical chemistry, radiation chemistry radiation biology Faculty 3 full time, 1 part time 5 graduate students enrolled.

Botany Ecology, taxonomy, paleobotany In radiation biology there is a combined program with Departments of Zoology and Bacteriology Prerequisites beginning botany plant morphology, field botany, beginning chemistry Recommended mathematics, GRE Faculty 5 full time, 3 part time 6 graduate students enrolled

Chemical Engineering Liquid liquid extrac

tion, mechanics of drops and bubbles, gas adsorption, percolation operations fluid mechanics, non-Newtonian flow behavior, flow double refraction, ion exchange, gas absorption kinetics Prerequisites bachelor's degree, or equivalent, with major in this field Recommended master's degree in chemical engineering Faculty 5 full time, 2 part time 6 graduate students enrolled

Chemistry Analytical, inorganic organic, and physical chemistry, biochemistry Prerequisites one year each of general chemistry, analytical chemistry, organic chemistry, and physical chemistry, reading knowledge of German and one other foreign language in which there is considerable chemical literature Ph.D. is also awarded in biochemistry Program administered by Department of Chemistry at the Medical College in Memphis, Tenn Faculty 15 full time 27 graduate students enrolled

English English and American literature Prerequisites undergraduate major in English, or its equivalent Recommended a master's degree in English Faculty 15 full time 14 graduate students enrolled

Entomology Taxonomy, ecology, economic entomology Prerequisites zoology 221, 481 2 3, 311, 312, and 313, or the equivalent of these courses Recommended a master's degree in entomology Faculty 2 full time 3 graduate students enrolled Assistantship applications must be submitted by April 15

Geography Prerequisites undergraduate major in geography acceptable to the department, German and French Faculty 4 full time, 1 part time 1 graduate student enrolled

Geology Prerequisites master's degree, or equivalent, German and, generally French Faculty 8 full time 4 graduate students enrolled

History U.S. history and medieval history Prerequisites M.A. at this University, or qualifying examination, qualifying examination for transfer students Faculty 10 full time, 1 part time 4 graduate students enrolled

Mathematics Algebra, analysis, probability, geometry, topology Combined programs with other departments include one course with physics and one with philosophy Prerequisites M.A., with major in mathematics, or its equivalent, minimum 'B' overall average, A' average in mathematics preferred Recommended reading knowledge of French, German, or Russian, GRE

Faculty 19 full time, 6 part time 11 graduate students enrolled

Metallurgy Physical metallurgy, calorimetry, gases in metals Prerequisites bachelor's degree, or equivalent, with a major in this field Recommended master's degree in metallurgy Faculty 2 full time, 1 part time 4 graduate students enrolled

Physics Infrared and molecular spectroscopy nuclear emulsion study of high energy particles, instrumentation, theoretical nuclear and molecular physics Prerequisites an undergraduate major in physics, or its equivalent, physics 311 2, 314, 321 2 3, 411 2 3 constitute the minimum courses prerequisite to graduate study, usually French, German, or Russian Faculty 10 full time, 7 part time 33 graduate students enrolled

Political Science Public administration, public law, political theory, political parties, comparative government Prerequisites the equivalent of an undergraduate major in political science Recommended M.A. in this field Faculty 7 full time, 4 part time 1 graduate student enrolled

Psychology Clinical, industrial, and general experimental psychology, psychometrics Prerequisites MAT raw score above 50, grade average of 'B', adequate recommendation, reference ratings on special scale Recommended mathematics 304 and 305, or the equivalent Faculty 10 full time, 2 part time 35 graduate students enrolled

Radiation Biology Biochemistry, cytology, ecology, embryology, entomology, genetics, parasitology, pathology, physiology Program involves Departments of Bacteriology Botany Zoology and Entomology, Chemistry Physics, and a cooperative arrangement with the Biology Division of Oak Ridge National Laboratories Prerequisites bacteriology, biology, botany, or zoology—30 quarter or 20 semester hours, college mathematics—9 quarter or 6 semester hours, chemistry—general and organic, 24 quarter or 16 semester hours, physics—12 quarter or 8 semester hours Faculty 13 full time, 7 part time 1 graduate student enrolled

Zoology Cytology, ecology, genetics ornithology, parasitology, physiology, embryology, radiation biology Prerequisites one course in college mathematics, one year of chemistry, at least 12 hours of general biology or zoology, at least 18 hours of advanced zoology Faculty 8 full

time 6 graduate students enrolled. Assistantship applications must be submitted by April 15

NOTES

Doctoral candidates may hold a teaching assistantship under the supervision of the head of the major department

Agricultural and Mechanical College of Texas

COLLEGE STATION, TEXAS

Graduate School

The first Ph.D. was awarded in 1940, a total of 192 Ph.D.s have been conferred through January 1957. School's objective is to offer education beyond the bachelor's level to men who aspire to become intellectual leaders in various professions and fields of teaching and research. The Dean of the School is responsible for the academic program of all graduate students. A Graduate Council is an advisory body to the Dean. Committees on graduate instruction in each of the several schools make recommendations for graduate work in the school concerned.

Ocean going research vessel and station for oceanographic research, electron microscopy and Texas radar storm warning centers, A.C. network calculator, extensive computer and statistical analysis facilities. Several foundation grants in support of chemical research. Affiliations include Texas A. and M. Research Foundation, Texas Forestry Service, and Texas Transportation Institute. The School is associated with Texas Agricultural Experiment Station, which has 33,000 acres, 26 substations for research.

Men Land grant college. Summer courses 25 Ph.D.s awarded in 1956-7.

Residence requirements for doctorate: six semesters of full time graduate study, or its equivalent, beyond the bachelor's degree. All the work must be done in resident graduate study at some approved educational institution, at least two of the last four semesters must be spent at this institution.

ADMISSION REQUIREMENTS

Master's degree in field of specialization or its

equivalent. Recommendations required from individuals acquainted with applicant's previous academic training.

Required courses are individually determined upon recommendation of student's committee.

Apply to Registrar and Director of Admissions.

FEES AND FIRST YEAR AID

Tuition—in state \$50 per semester, out-of-state \$200 per semester. Room—\$106.60 (9 months). Board—\$314.55.

Teaching and research assistantships \$1,350 for 9 months, \$1,800 for 12 months for qualified graduate students. If a student enters with a master's degree, the stipend is \$1,500 for 9 months, \$2,000 for 12 months. Apply to the Dean of the Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics and Sociology Farm management, land economics, agricultural marketing and policy, and administration. Faculty 21 full time 7 graduate students enrolled.

Agronomy Soil science, field crop science, plant breeding, pasture and turf management, soil physics, soil chemistry, soil mineralogy. Faculty 33 full time 15 graduate students enrolled.

Animal Husbandry Physiology of reproduction, animal nutrition, animal breeding, meats. Faculty 16 full time 11 graduate students enrolled.

Biochemistry and Nutrition Biochemistry and nutrition, animal nutrition, poultry science, plant chemistry. Faculty 9 full time 23 graduate students enrolled.

Biology Vertebrate zoology, invertebrate zoology, plant morphology, embryology, cytology, parasitology. Faculty 14 full time 4 graduate students enrolled.

Chemical Engineering Chemical engineering, applied nuclear energy, chemical thermodynamics, corrosion, electrochemical processes, inorganic chemical technology, instrumentation, kinetics and reactor design, nuclear fuels and processes, organic chemical technology, petrochemical technology, petroleum refining technology, plastics, vegetable oil technology, water treatment. Faculty 3 full time 4 graduate students enrolled.

Chemistry Analytical, inorganic, organic, and

physical chemistry Faculty 17 full time 11 graduate students enrolled

Civil Engineering Soil mechanics, structures, highway engineering, hydraulic engineering, hydraulics, municipal engineering Faculty 19 full time 2 graduate students enrolled

Dairy Science Dairy manufactures, dairy production, food technology Faculty 6 full time 6 graduate students enrolled

Electrical Engineering Electronic components for analog computers, power systems and machinery, communications, electrical machinery, electronics, high frequency systems, servomechanism Faculty 10 full time 4 graduate students enrolled

Entomology Economic entomology, insect physiology and toxicology, morphology, agriculture Faculty 10 full time 12 graduate students enrolled

Genetics Genetics, animal breeding, plant breeding Faculty 17 full time 9 graduate students enrolled

Geology Geology, economic, geochemistry, mineralogy, paleontology, petrology (including petrography), physiography, stratigraphy, structural Faculty 11 full time 1 graduate student enrolled

Horticulture Fruit production, fruit and vegetable processing, vegetable production, food technology Faculty 9 full time 1 graduate student enrolled

Mathematics Algebra, analysis, applied, number theory, pure, statistics Faculty 12 full time

Mechanical Engineering Heat, power, and thermodynamics, fluid mechanics, heat transfer mechanical design, mechanics and machine design, metallurgy, nuclear power, power generation Faculty 9 full time 3 graduate students enrolled

Oceanography Meteorological oceanography Faculty 13 full time 19 graduate students enrolled

Petroleum Engineering Natural gas, production, drilling engineering, economics and valuation or petroleum economics, production methods or production engineering, reservoir equilibrium and mechanics, subsurface engineering problems, transportation and field processing Faculty 6 full time 2 graduate students enrolled

Physics Acoustics, atomic, biophysics, electric

ity and magnetism, liquid state, mechanics, molecular, nuclear solid state, theoretical, thermodynamics Faculty 8 full time 12 graduate students enrolled

Plant Physiology and Pathology Faculty 11 full time 13 graduate students enrolled

Poultry Science Nutrition, breeding, marketing, management Faculty 8 full time 20 graduate students enrolled

Range and Forestry Range management Faculty 8 full time 15 graduate students enrolled

Veterinary Pathology Faculty 2 full time

Wildlife Management Vertebrate systematics, vertebrate ecology Faculty 5 full time 4 graduate students enrolled

Texas Technological College

LUBBOCK, TEXAS

The Graduate School

Established 1937, although graduate degrees had been awarded earlier. First doctorate awarded in 1952. A state supported college. Dormitory system accommodates 2,700.

Department of Education offers Ed D

Mass spectrometer, infrared and ultraviolet spectrometers. Items from Short Title Catalog (microfilm), many unpublished letters of the 'Blackwood Group' (photostats) good files of 18th and 19th century English magazines.

Southwest Collection containing much unpublished material relating to the ranching industry in the Southwest. Psychological Testing and Counseling Center. Infrabuman primate and subhuman laboratories. Cerebral Palsy Treatment Center, State Hospital (for psychiatric service), Tuberculosis Sanitarium (for counseling service).

Men and women. Summer and evening courses.

Residence requirement for doctorate: regardless of the amount of work completed elsewhere, the applicant must spend one full year (two consecutive semesters) in full time residence work at this institution.

ADMISSION REQUIREMENTS

Bachelor's degree from a recognized institu

tion undergraduate work above average, score on Aptitude Test of GRE that places applicant in upper half by national norms

Before admission to candidacy the applicant must have passed reading examinations in French (or Spanish) and German

Aptitude Test of GRE is required Advanced Test in the major field is recommended and is required in one department

Apply to Registrar between March 1 and April 1 for the following Fall semester

FEES AND FIRST YEAR AID

Tuition—In state \$50 per semester, out of state \$200 per semester Room and board—\$75 to \$85 per month

About 25 graduate assistantships, usually \$1 000 each requiring only nominal duties Also a number of laboratory assistantships Apply to head of department in which work is to be done between February 1 and April 1 for the following Fall semester

FIELDS OF STUDY FOR THE PH D

Chemistry Prerequisites inorganic, analytical organic, and physical chemistry Preliminary diagnostic tests Faculty 12 full time 2 part time 17 graduate students enrolled

English Prerequisites English major Faculty 11 full time 2 part time 30 graduate students enrolled

History American Southwest Western history Prerequisites history major Qualifying examination in ancient and medieval history required Recommended publication of an article in a professional journal teaching of freshmen courses under supervision Faculty 11 full time 1 part time 18 graduate students enrolled

Psychology General, experimental counseling Prerequisites Student must possess or attain master's degree in psychology Tests MAT Advanced test (GRE) in psychology Faculty 6 full time 2 part time 37 graduate students enrolled

NOTES

Students holding grants mentioned above work closely with a major professor and occasionally conduct a class under his direction Some departments have special seminars for teaching fellows and other graduate students for discussion of teaching problems

The University of Texas

AUSTIN, TEXAS

Graduate School

Graduate work was established in 1883 Authorized in 1910 the first Ph D was granted in 1915 All departments are under one central administration Most work is at the main campus in Austin, but some work in basic sciences related to medical and dental subjects is at Dallas, Galveston and Houston

Ed D is also awarded

Some university dormitories for men and women many private rooms and apartments are available Notable rare book collections in University library Graduate programs use McDonald Observatory at Fort Davis Institute of Marine Science at Port Aransas and the affiliated facilities of the Oak Ridge Institute of Nuclear Studies at Oak Ridge Tennessee and the Los Alamos National Scientific Laboratory at Los Alamos New Mexico

Men and women Summer courses Evening courses mainly in education 132 Ph D s awarded in 1956-7

Residence requirement for doctorate minimum of three full years of graduate study, with at least one full year at this University

Transfer students must furnish official transcript of entire college record including high school units

ADMISSION REQUIREMENTS

Bachelor's degree, with an appropriate undergraduate major, a B average on all advanced work taken, an acceptable score on the GRE Aptitude Test

French and German, but with substitution of Russian or Spanish on approval

Apply to Director of Admissions sixty days before registration date

FEES AND FIRST YEAR AID

Tuition—in state \$50 per semester, out of state \$200 per semester Room—men \$45 \$90 (dormitories), women \$90-\$146 including board (dormitories)

University and departmental scholarships, teaching assistantships and research assistantships are available. Apply to chairman of the department concerned by March 1

FIELDS OF STUDY FOR THE PH D

Aeronautical Engineering Aerodynamics, air craft structures, and propulsion, including both the analytical and experimental phases Combined programs with all other engineering departments, jet propulsion with Defense Research Laboratory Prerequisites BS in engineering from this University, or the equivalent in that branch of engineering selected as the major for graduate study Faculty 6 full time 12 graduate students enrolled

Bacteriology General bacteriology, food microbiology, public health and pathogenic bacteriology, immunology, microbial genetics, and physiology of microorganisms All programs must have an appropriate minor Prerequisites an undergraduate major, including 12 semester hours of advanced work in bacteriology Faculty 5 full time 59 graduate students enrolled

Botany Photoperiod and plant hormones, tissue and organ culture, algal physiology, anatomy, cytology and plant reproduction genetics, ecology, taxonomy and cytotoxicology, and mycology All programs must have an appropriate minor Prerequisites adequate foundation for majoring in botany is represented by general biology general botany, and 12 hours selected from plant physiology, plant taxonomy, and plant genetics Faculty 9 full time 16 graduate students enrolled

Business Administration Accounting, statistics, finance, management marketing, resources, transportation, and international trade All programs must have an appropriate minor Prerequisites bachelor's degree from this University or the equivalent, credit for 6 semester hours of principles of economics, and 30 hours of work in business administration Faculty 45 full time 215 graduate students enrolled

Chemical Engineering Applied nuclear energy, chemical thermodynamics, electrochemical processes, inorganic chemical technology instrumentation kinetics and reactor design, organic chemical technology, petrochemical technology, and petroleum refining technology All programs must have an appropriate minor Prerequisites BS in engineering from this University, or the equivalent in that branch of engineering selected as the major for graduate study, grade average of at least B in the last two undergraduate years at a school accredited by American Insti-

tute of Chemical Engineering Faculty 5 full time 49 graduate students enrolled

Chemistry Biochemistry, analytical, inorganic, organic, and physical chemistry All programs must have an appropriate minor Prerequisites preliminary training of 24 semester hours in chemistry, including 6 hours each in general chemistry, quantitative analysis, organic, and physical chemistry, at least 12 hours must be in advanced work Faculty 20 full time 152 graduate students enrolled

Civil Engineering Structures, highways, soil mechanics, sanitary engineering materials, and hydraulics All programs must have an appropriate minor Prerequisites BS from this University, or the equivalent in that branch of engineering selected as the major for graduate study Faculty 16 full time 31 graduate students enrolled

Classical Languages Greek, Latin All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in the major, if Latin, undergraduate course in advanced prose composition Faculty 2 full time 12 graduate students enrolled

Economics Economic theory, economic history, agricultural economics, economic resources, international economics, labor economics, Latin American economics money and banking public finance, public regulation of business government business, and public utilities All programs must have an appropriate minor Prerequisites undergraduate major including 12 semester hours of advanced work in economics, plus 3 semester hours in economic and social statistics, or equivalent Faculty 11 full time 50 graduate students enrolled

Education History, philosophy and social foundations of education, intercultural, physical, and health education, human development, educational psychology, pupil personnel work, child accounting, administration curriculum, and instructional procedures All programs must have an appropriate major Prerequisites undergraduate major, including 12 semester hours of advanced work in education Ed D also awarded in this field Faculty 56 full time 451 graduate students enrolled

Electrical Engineering Electric communications, electronics, servomechanics, power transmission, high frequency transmission over wires,

as well as radio communication All programs must have an appropriate minor Prerequisites BS in engineering from this University, or equivalent in that branch of engineering selected as the major for graduate study Faculty 11 full time 42 graduate students enrolled

Engineering Mechanics Dynamics, elasticity, stress analysis All programs must have an appropriate minor Prerequisites BS in engineering from this University or equivalent in that branch of engineering selected as the major for graduate study, 12 hours of junior or senior courses in strength of materials structures or machine design, 6 hours of junior or senior courses in mathematics, including differential equations, 3 hours of fluid mechanics or hydraulics Faculty 4 full time 4 graduate students enrolled

English English literature, American literature, linguistics, and criticism All programs must have an appropriate minor Prerequisites undergraduate major including 12 semester hours of advanced work in English, all candidates must pass written examination on a reading list of the classics, chiefly American and English. Faculty 39 full time 122 graduate students enrolled

Geology Invertebrate paleontology, micropaleontology vertebrate paleontology, general and structural geology geomorphology, mineralogy, petrology petrography, stratigraphy field geology, petroleum geology, geochemistry and geophysics All programs must have an appropriate minor Prerequisites general geology, invertebrate paleontology, mineralogy and petrology, elementary field geology, advanced historical geology, structural geology, and field geology, examination to test ability in English. Faculty 16 full time 120 graduate students enrolled

German Languages German literature, medieval epic and lyric poetry, drama of the Middle Ages and the Reformation period, literature of the Baroque of Classicism and Romanticism, and of the modern period. All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in the major and the equivalent of 6 semester hours of the history of German literature Faculty 6 full time 19 graduate students enrolled.

Government Political theory public law, comparative government, international relations and American diplomacy. American government

and politics, and public administration All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in government Faculty 12 full time 41 graduate students enrolled

History American, European, and Latin American history All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in history Faculty 17 full time 41 graduate students enrolled

Latin American Studies Anthropology, business administration economics, education, geography, government history, and Spanish. This is a combined program Prerequisites A B, with a major in Latin American Studies from this University, or equivalent Faculty 8 full time 24 graduate students enrolled

Mathematics Algebra, analysis, applied mathematics, number theory, pure mathematics, and statistics All programs must have an appropriate minor Prerequisites undergraduate major including 12 semester hours of advanced work in mathematics Faculty 12 full time 98 graduate students enrolled

Mechanical Engineering Air conditioning and refrigeration, fluid mechanics, heat, power, and thermodynamics, heat transfer, material processes, mechanical design, mechanics and machine design, metallurgy, nuclear power, and power generation Prerequisites BS in engineering from this University, or equivalent in that branch of engineering selected as the major for graduate study Faculty 17 full time 36 graduate students enrolled

Petroleum Engineering Application of mathematics, physics, chemistry, and geology to the development, production, transportation measurement, and storage of petroleum, natural gas and natural gasoline All programs must have an appropriate minor Prerequisites BS in engineering from this University, or equivalent in that branch of engineering selected as the major for graduate study Faculty 8 full time 23 graduate students enrolled

Pharmacy Pharmacy, pharmaceutical chemistry, pharmacognosy, pharmacology All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in pharmacy

Faculty 12 full time 13 graduate students enrolled

Philosophy History of philosophy, logic, epistemology, metaphysics, ethics, aesthetics, and theory of value All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work, undergraduate work should include history of ancient, medieval, and modern philosophy Faculty 6 full time 18 graduate students enrolled

Physics Acoustics, biophysics, electricity and magnetism, low temperature, atomic, molecular nuclear, solid state, and theoretical physics, mechanics, and thermodynamics All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in physics, advanced work in mechanics, heat, light, and electricity and magnetism Faculty 16 full time 88 graduate students enrolled

Psychology Child, clinical, comparative, experimental, physiological, industrial, and social psychology All programs must have an appropriate minor Prerequisites undergraduate major with 12 semester hours of advanced work in psychology Faculty 13 full time 64 graduate students enrolled

Romance Languages French language and literature, Italian language and literature Portuguese language and literature, Spanish language and literature, and Romance philology All programs must have an appropriate minor Prerequisites undergraduate major with 12 semester hours of advanced work in the major Faculty 16 full time 34 graduate students enrolled

Sociology History and theory, research methods, human ecology and demography, collective behavior and social change sociology of institutions, and social organization and disorganization All programs must have an appropriate minor Prerequisites undergraduate major with 12 semester hours of advanced work, credit for 3 hours of research methods (statistical or nonstatistical), 3 hours of social theory Faculty 9 full time 26 graduate students enrolled

Zoology Genetics and cytology, entomology, vertebrate biology, physiology, and biophysics All programs must have an appropriate minor Prerequisites undergraduate major, including 12 semester hours of advanced work in zoology, suitable correlated training in other natural sci-

ences Faculty 12 full time 57 graduate students enrolled

NOTES

Various programs in basic sciences related to the medical sciences are available at the Medical Branch at Galveston, the Southwestern Medical School at Dallas, and the M D Anderson Hospital at Houston

Texas Woman's University

DENTON, TEXAS

Graduate School

Since its establishment in 1901, the University has been governed by a Board of Regents comprising nine persons nominated by the Governor of Texas Women must occupy at least four of these board positions Graduate instruction has been offered for more than a quarter of a century Since 1952 the Graduate School has operated as a unit under its own Dean and Graduate Council

The College of Health, Physical Education and Recreation offers both Ph D and Ed D as does the College of Household Arts and Sciences College of Health Physical Education and Recreation has a gymnasium, outdoor and indoor swimming pools, 18 hole golf course, rifle range dance studios air conditioned classrooms College of Household Arts and Sciences has a laboratory for research on body fluids X ray machine, microdensitometric bone density assembly, electron microscope, medical nutrition clinic, animal laboratory experimental kitchens and housing units, detergent laboratories, power laundry and drycleaning plant

Dormitories for graduate students Matriculation restricted to women Summer courses 8 Ph D s awarded in 1956 7

Residence requirement for doctorate a minimum of three full academic years of graduate work in residence at an approved college or university, at least one continuous year of this work (preferably the last) must be in residence at this institution

ADMISSION REQUIREMENTS

Undergraduate degree, demonstrated ability

to pursue advanced study and research, adequate preparation to carry graduate work in the fields chosen for the major and minor, or registration for needed courses without graduate credit

Satisfactory reading knowledge of two foreign languages, ordinarily French and German, in some instances a substitute language may be offered

Recommended GRE

Apply prior to semester registration to Dean of Admissions, Dean of the Graduate School and Dean, or Director, of the college in which the student will be registered

A comprehensive preliminary written examination in the major and minor fields and a comprehensive oral are required before admission to candidacy

FEES AND FIRST YEAR AID

Tuition—in state, \$50 per semester, out of state, \$175 Room—\$259 including board

Variety of scholarships, fellowships and campus jobs are offered, depending on individual need and area of study Apply prior to registration to Dean of Admissions Registrar

FIELDS OF STUDY FOR THE PH D

Child Development and Nursery Education

Studies of behavior patterns in pre school children, child parental relations, psychological and physical development of infants and pre school children. Ph.D. candidates select their majors in the College of Household Arts and Sciences and their minors in other areas of the College or in the Psychology or Sociology Departments Prerequisites undergraduate degree in this area, supplemented by courses in psychology, working knowledge of statistics. Program administered by College of Household Arts and Sciences. Faculty 25 full time, 4 part time 78 graduate students enrolled.

Clothing and Costume Design Anthropometric studies relating to the fit of garments, durability of certain types of home and mass produced garments, garment workmanship, anatomical relations of certain clothing designs, and psychological aspects of clothing of certain designs and colors. Students have the opportunity of cooperating in their studies with costume design and fashion centers of Texas Ph.D. stu-

dents choose their minor in a variety of fields, such as textiles, textile technology psychology, sociology Prerequisites an undergraduate major in clothing and/or costume design, working knowledge of statistics Program administered by College of Household Arts and Sciences Faculty 25 full time, 4 part time 78 graduate students enrolled

Dance and Related Arts Prerequisites undergraduate major in dance, physical education health and physical education, health, physical education and recreation, or in a field closely related to dance such as art, speech, or music Ed.D. also awarded in this field Administered by College of Health Physical Education and Recreation. Faculty 8 full time 5 part time 20 graduate students enrolled

Foods and Nutrition Studies of the longitudinal or mass nutrition type, using the facilities of the Nelda Childers Stark Laboratories for Human Nutrition Research, involving children, entire families and institutional subjects, food acceptance, conservation of nutritional values of foods and related food problems Ph.D. students choose their minors from such areas as biochemistry biology or sociology Prerequisites undergraduate major in foods and nutrition, working knowledge of statistics Program administered by the College of Household Arts and Sciences Faculty 25 full time 4 part time 78 graduate students enrolled

Health Education Prerequisites undergraduate major in health education, health and physical education, or health, physical education and recreation or in a field closely related to health education Ed.D. also given in this field Program administered by the College of Health Physical Education and Recreation. Faculty 8 full time, 5 part time 20 graduate students enrolled

Health and Physical Education Prerequisites undergraduate major in health and physical education, health, physical education and recreation or physical education Graduates who have not completed an undergraduate major in one of these areas will be required to make up deficiencies Ed.D. also awarded in this field Program administered by the College of Health Physical Education and Recreation Faculty 8 full time, 5 part time 20 graduate students enrolled

Health Physical Education and Recreation See Health and Physical Education *supra* Faculty 8 full time, 5 part time 20 graduate students enrolled

Home Economics Education Design and evaluation of new teaching methods, using objective methods of evaluation, community and school problems relating to the household arts and sciences, and evaluation of possible methods of solving them. Ph D students must select minor in a subject matter area such as foods and nutrition clothing, textiles, child development, sociology, or psychology Prerequisites undergraduate major in home economics with courses in education and psychology Ed.D also awarded in this field Program administered by the College of Household Arts and Sciences Faculty 25 full time, 4 part time 78 graduate students enrolled

Home Management Problems relating to economics of the household, economy of time in conduct of household activities, room arrangement utility and furniture arrangement Ph D students choose their minor from such fields as economics, family living home economics education psychology, or sociology Prerequisites undergraduate courses in general home economics with emphasis on home management (including house residence) working knowledge of statistics Program administered by the College of Household Arts and Sciences Faculty 25 full time 4 part time 78 graduate students enrolled

Institution Administration Food service administration in cooperation with the Board for Texas State Hospitals and Special Schools and with the Dallas City County (Parkland) Hospital, or in various aspects of nutrition in relation to a hospital institutional or industrial food service Ph D students choose their minor in nutrition or economics Prerequisites undergraduate courses in institution administration, nutrition, dietetics and economics, working knowledge of statistics Program administered by the College of Household Arts and Sciences Faculty 25 full time, 4 part time 78 graduate students enrolled

Recreation or Recreation Administration Prerequisites undergraduate major in health and physical education, health, physical education and recreation, physical education, recreation, or such a closely related field as botany and biology, art, sociology, speech, music, dance, sports, or

aquatics Ed D also awarded in this field Program administered by the College of Health, Physical Education and Recreation Faculty 8 full time, 5 part time 20 graduate students enrolled

Textiles and Textile Technology Research problems in the chemistry and technology of natural and man made fibers, including electron microscopy Studies in surface activity in relation to detergency, in soil removal, and in textile changes during cleansing Ph.D students choose their minors in such areas as physical chemistry, or organic chemistry, physics, or a combination of the physical sciences Prerequisites undergraduate courses in textiles chemistry, and physics, working knowledge of statistics Program administered by the College of Household Arts and Sciences Faculty 25 full time, 4 part time 78 graduate students enrolled

NOTES

When the nature of the course permits theoretical and practical teacher training is available

Tufts University

MEDFORD, MASSACHUSETTS

Graduate School of Arts and Sciences

Until 1955 Tufts was officially styled Tufts College and focussed its efforts on training undergraduates, except in its Schools of Medicine and Dental Medicine and the Fletcher School of International Law and Diplomacy As early as 1876, however it awarded the masters degree in course The Graduate School of Arts and Sciences was formally established in 1892 and the first Ph D awarded in 1895

Institute for economic research, institute for applied experimental psychology

Summer and evening courses 1 Ph D awarded in 1956-7

Both Fletcher School and Medical and Dental Schools offer Ph D

At least one full year must be spent in residence for doctorate Three years of advanced study and research required

ADMISSION REQUIREMENTS

Graduation from college and a record which shows promise of performing graduate study with distinction

Reading knowledge of one foreign language, plus ability to read any other language which may be necessary for effective prosecution of the program of research and study which is contemplated Recommended GRE

Apply to Dean Graduate School of Arts and Sciences

FEES AND FIRST YEAR AID

Tuition—\$25 per credit Normal program is 15 credits Room—\$7 \$8 per week for men and women Board—\$12 \$15

Complete or partial remission of tuition, loans, opportunities to assist in teaching or research for varying amounts

Apply to Dean, Graduate School of Arts and Sciences at least six weeks prior to semester in which you wish to register

FIELDS OF STUDY FOR THE PH D

Biochemistry 9 graduate students enrolled

Criminology General sociology Faculty 5 full time, 1 part time

Pharmacology Cardiovascular research and smooth muscle research Faculty 4 full time, 2 part time

Physics General, solid state, atomic, and engineering physics, optics mechanics, and quantum mechanics Faculty 10 full time 7 graduate students enrolled.

Physiology Lipid metabolism, carbohydrate metabolism, nucleic acid metabolism, nucleic acid chemistry Faculty 5 full time, 1 part time. 3 graduate students enrolled

Psychology Perception (especially in vision), EEG, physiological psychology, social psychology, aviation psychology, human engineering. Prerequisites introductory and experimental psychology, elementary statistics, reading knowledge of two modern foreign languages Recommended MAT, GRE. Must have some basic science and mathematics, should also have approx. 12 15 hours of additional work in psychology Faculty 3 full time, 8 part time 11 graduate students enrolled.

Sociology 7 graduate students enrolled.

Tulane University

NEW ORLEANS, LOUISIANA

The Graduate School

Graduate work first provided 1883 4 First Ph D conferred 1887 Work toward advanced degrees offered in usual arts and sciences fields, four engineering fields, and basic medical sciences Dormitory rooms available

D P H offered by Division of Graduate Medicine, M D by School of Medicine M S W by School of Social Work, M B A by School of Business Administration

Urban life research and Middle American research institutes, biophysics laboratory, Southern historical manuscripts, outstanding area for zoological and botanical field work.

White men and women. Privately endowed Limited number of summer courses 16 Ph D s awarded in 1956-7

Residence requirement for doctorate one full year

As much as 24 semester hours towards Ph D accepted from transfer students

ADMISSION REQUIREMENTS

Applicants with bachelor's degree from recognized institutions may be admitted if academic records and personal attributes indicate ability to pursue advanced study successfully Averages in undergraduate study. B or above Aptitude and advanced tests of GRE Apply to Office of the Dean, The Graduate School.

FEES AND FIRST YEAR AID

Tuition—\$550, plus \$100 per year Room—men \$122 50 per semester, women \$100 per semester

Scholarships based on merit and need, long term, non interest loans Apply to Office of the Dean, The Graduate School, before Mar 1 for next regular session (Sept June)

FIELDS OF STUDY FOR THE PH D

Anatomy Experimental neurology, histochemistry, electron microscopy, cancer, reticulo-endothelial system, dermatoglyphics, medical genetics. Prerequisites substantial preparation in the natural and physical sciences, GRE Students usually follow physiology as a minor Faculty

9 full time, 8 part time 1 graduate student enrolled

Biochemistry Enzymology, amino acid deficient diets, metabolism of mammalian erythrocytes, metabolic activities of streptococci, fungi, trypanosomes and amoeba, metabolism of cardiac muscle, chemistry of psychotic states, biochemistry of the eye, vitamin B12 and intrinsic factor Prerequisites full major in college chemistry, including general, physical, qualitative quantitative, and organic, 1 year each of physics and biology, GRE Formal integrated course with pathology, minors in chemistry, physiology, pharmacology, or microbiology Faculty 10 full time, 4 part time 15 graduate students enrolled

Chemistry Analytical inorganic, organic, and physical chemistry Prerequisites general chemistry, qualitative and quantitative analysis, organic chemistry physical chemistry, calculus, physics, GRE, grade average of B Recommended advanced physics and advanced mathematics Faculty 7 full time 2 part time 40 graduate students enrolled

Economics Economic theory, economic history, economic development, labor, public finance money and banking resources, social control of business Prerequisites economic principles, statistics, GRE, well balanced major in economics, B average Recommended intermediate economic theory, mathematics, social sciences other than economics Faculty 10 full time 3 part time 10 graduate students enrolled

English The usual period figure, and type divisions in English and American language and literature Prerequisites major in English, GRE at least B average in undergraduate work Faculty 20 full time, 4 part time 34 graduate students enrolled

French All fields of French language and literature Prerequisites full major in undergraduate English, Latin and two modern languages other than the major, qualifying examinations based on extensive reading lists French majors usually minor in Spanish, sometimes English Recommended a year's residence in France, courses in medieval and modern history and in English literature Faculty 6 full time 11 graduate students enrolled

History The United States especially cultural and political history and all phases of the history of the South, Latin America, especially Caribbean area modern Europe, especially his-

tory of France, 1789-1870, and history of Germany and European diplomacy since 1870, England, especially the Stuart era and 20th century, medieval and ancient history (MA only) Prerequisites full undergraduate major in history with reasonably high average in major and minor, French, German, and occasionally Spanish, GRE Combined programs one of five fields is a related field, usually political science, economics or American literature Faculty 15 full time, 2 part time 30 graduate students enrolled

Immunology Prerequisites biochemistry, GRE, departmental entrance examination, good undergraduate record in chemistry and biology Recommended physics mathematics DPH also awarded in this field Program administered by Dept. of Tropical Medicine and Public Health Faculty 8 full time 7 graduate students enrolled

Mathematics Algebra (semigroups), topological algebra (semigroups groups linear spaces algebras, all with topologies), topology (point set, transformation groups), algebraic topology (cohomology), analysis (complex function theory rings of operators function spaces measure theory), algebraic logic Prerequisites calculus through a problem course in differential equations Recommended course in modern algebra at level of book of Birkhoff and MacLane, advanced calculus, modern geometry, baby real or complex variables elementary topology Faculty 17 full time, 15 part time 17 graduate students enrolled

Microbiology Medical microbiology, virology and rickettsiology

Parasitology Medical parasitology and entomology Prerequisites invertebrate zoology, comparative anatomy, histology, physiology organic chemistry Recommended microbiology, general physics biochemistry Combined programs with microbiology biochemistry pathology zoology Faculty 6 full time 3 part time 13 graduate students enrolled

Pharmacology Drug activity relationships, renal and cardiac pharmacology drug metabolism, drug enzyme interrelationships Prerequisites basic courses in mathematics chemistry, biology Recommended biochemistry, physical chemistry, cellular physiology Faculty 5 full time, 1 part time 2 graduate students enrolled

Philosophy Metaphysics (ontology), epistemology, logic, philosophy of science, semantics,

theory of value ethics, aesthetics philosophy of religion various fields or persons in the history of philosophy Prerequisites history of western philosophy, traditional logic, and 9 semester hours in other philosophy courses GRE Recommended general psychology, courses related to field of specialization or the subject of the dissertation Faculty 8 full time 9 graduate students enrolled.

Physiology Neurophysiology Prerequisites mathematics through calculus, college biology and physics, inorganic, organic, qualitative, and quantitative chemistry, preliminary oral and/or written departmental qualifying examination. Recommended psychology and physical chemistry Biochemistry may be used as a major credit Faculty 4 full time, 2 part time 4 graduate students enrolled.

Political Science Comparative government, international relations, political theory, political behavior, public administration, and American political institutions Combined program with Latin American Studies Recommended a minor of 18 hours of undergraduate work Faculty 6 full time 10 graduate students enrolled

Psychology Experimental and social. Combined program with Sociology Anthropology Prerequisites French and German GRE Recommended strong background in mathematics Faculty 8 full time, 2 part time 24 graduate students enrolled.

Sociology and Anthropology Social organization and social psychology Combined program with Psychology Prerequisites several courses in sociology, course in methods of social research, preliminary examinations in social organization, social psychology and anthropology, theory, ecology and demography and methodology (which are required as minors for the graduate student) Recommended course in field research, Presentation of dissertation to faculty, defense required Faculty 10 full time, 1 part time 10 graduate students enrolled

Spanish Hispanic literature and philology Prerequisites M.A. or equivalent, 4 foreign languages other than Spanish written qualifying examination, general oral examination and defense of thesis minimum of 18 semester hours of graduate work for the minor, minimum of 30 semester hours for the major Combined programs minors—French 12, German 4, Latin American studies 2, English 1, Romance philol

ogy 1, no minor 1 Faculty 6 full time, 1 part time 21 graduate students enrolled

Zoology Physiology, embryology, herpetology, ichthyology invertebrate zoology Prerequisites major in zoology, basic training in mathematics, chemistry, physics botany, GRE, departmental qualifying written test Recommended geology Faculty 10 full time, 1 part time 13 graduate students enrolled

NOTES

Careful attention to providing supervised teaching experience Broad orientation for various aspects of academic citizenship

Union Theological Seminary

NEW YORK, NEW YORK

Union Theological Seminary is an interdenominational seminary founded in 1836 for the training of protestant ministers and teachers of religion and theology A member of AATS A joint committee representing Union Theological Seminary and Columbia University directs a course leading to a Ph.D. granted by the latter In operation for twenty years, the program involves several Columbia departments such as religion, classics, economics, history, anthropology, languages, etc

Men and women Summer courses and evening courses at Columbia 4 Ph.D.s awarded in 1956-7

Residence requirement for doctorate 2 years (60 points) after a B.A. with a religion major However, generally one additional semester is needed After a B.D. or M.A. in religion, between one and two years

Transfer requirements no advance credit given except for B.D. or M.A. in religion

ADMISSION REQUIREMENTS

Outstanding college record and a religion major unless student has done a higher degree, such as a B.D. or a M.A. in religion.

German and French, others where necessary

General examination after one year of study Field examination after one and one half or two years of study

Apply before February 1 to Director of Graduate Studies

FEEES AND FIRST YEAR AID

Tuition—\$25 a point at Union Theological Seminary, \$30 a point at Columbia No housing available for married students

Available to first year students scholarships for more able students ranging between \$300 and \$1,500 Number given annually varies Need taken into account Most aid is given by Union Theological Seminary, one large scholarship annually by Columbia

Apply before February 1

FIELDS OF STUDY FOR THE PH D

Areas of concentration 1 Bible, 2 philosophy of religion and ethics, 3 history of religion, 4 religion and society Prerequisites practically all candidates take a survey course in history of religion and a history of philosophy, for Bible studies, Greek and Hebrew, others depending upon area of study Faculty 40 at both institutions 40 Ph D candidates in residence

University of Utah

SALT LAKE CITY, UTAH

Graduate School

Although advanced degrees were granted as early as 1894, graduate work did not become formally organized until 1908 when advanced degrees began to be awarded regularly The Graduate Division was established in 1917, reorganized on a more advanced level in 1925, and organized as a Graduate School in 1946 The Dean, in conjunction with 25 members of the Graduate Council (appointed by the President) and with the approval of the President's office, decides the policy of the Graduate School

A women's residence hall, a men's residence hall, and Stadium Village for married students Utah Symphony Orchestra, museums of anthropology, geology, and fine arts, meteorological weather station, mining facilities, including a campus experimental mine, pharmacy laboratory, including a model dispensary and retail store, speech laboratory, including a radio-TV studio and control room

Men and women Summer and evening courses 48 Ph D's awarded in 1956-7

Residence requirement for doctorate three or more years of approved study, one of the last two years must be spent in continuous residence, although approved research may be taken at other universities

Three letters of recommendation required of transfer students

ADMISSION REQUIREMENTS

B average, bachelor's degree, approval of department, and special entrance examinations when required by departments

Apply one month before registration (quarter system) to the Office of the Registrar of the Graduate School

FEEES AND FIRST YEAR AID

Tuition—\$199 in state, \$349 out of state Room—\$15 \$70 per month for men, \$190 \$208 per quarter for women

Graduate teaching and research fellowships available, University Research Fellowships at \$1,000 \$1,800 per academic year Apply before January 1 to the Graduate School or University Research Committee

FIELDS OF STUDY FOR THE PH D

Anatomy Histology, neurology, hematology Faculty 6 full time, 3 part time 7 graduate students enrolled

Bacteriology Microbiology Faculty 5 full time, 1 part time 11 graduate students enrolled

Biochemistry Prerequisites chemistry—organic and physical, physics—1 year course with laboratory mathematics—calculus, zoology—comparative vertebrate anatomy, reading knowledge of French and German Faculty 9 full time, 5 part time 15 graduate students enrolled

Botany Part of Biological Science Group and administered by it Faculty 19 full time, 3 part time 7 graduate students enrolled

Ceramics Refractories, design, phase rule in mineral systems, electron microscopy Faculty 3 full time 3 graduate students enrolled

Chemical Engineering Fluid mechanics, transfer processes, engineering thermodynamics Faculty 4 full time 12 graduate students enrolled

Chemistry Organic and physical chemistry Prerequisites undergraduate work in chemistry, plus additional courses in physics and mathe

matics as necessary for graduate work in chemistry Faculty 15 full time 34 graduate students enrolled

Civil Engineering Drawing surveying, hydraulics, structures highways, sanitation soil mechanics Faculty 12 full time 3 graduate students enrolled

Educational Administration Vocational, safety history of education philosophy of education, public relations Ed D also awarded in this field Faculty 11 full time 11 graduate students enrolled

Educational Psychology School counseling vocational rehabilitation counseling, special education school psychology measurement and evaluation learning and personality Faculty 12 full time 23 graduate students enrolled

Electrical Engineering Communication systems, transient analysis dielectrics, servomechanisms, electronic devices and circuits Faculty 13 full time 16 graduate students enrolled

Elementary Education Faculty 14 full time 6 graduate students enrolled

English English philology, American civilization comparative literature and drama GRE in literature required, as well as a qualifying examination Faculty 22 full time 12 graduate students enrolled

Experimental Biology Program administered by Biological Science Group Faculty 19 full time, 3 part time 2 graduate students enrolled

Fuel Technology Resources preparation combustion, synthetic fuels, corrosion explosives Faculty 1 full time 3 graduate students enrolled

Genetics Faculty 19 full time, 3 part time 4 graduate students enrolled Program administered by Biological Science Group

Geography Physical, cultural cartography, regional Faculty 4 full time 4 graduate students enrolled

Geology Historical, physical, structural, economic, paleontology, petroleum, sedimentation, ground water Faculty 6 full time 24 graduate students enrolled

Geophysics Seismology geomagnetics, geodesy, gravimetric, electrical, and magnetic methods of prospecting, well logging, radioactive prospecting Faculty 2 full time 10 graduate students enrolled

Health Education Physical education, professional education (dance, music, hockey, bowling,

etc.) recreation Combined program with Department of Education Faculty 22 full time 11 graduate students enrolled

History American national, colonization and expansion of North America, Latin American, European, ancient, Asiatic, British Qualifying examinations required Faculty 8 full time 9 graduate students enrolled

Languages French, Greek, Spanish German Faculty 15 full time 9 graduate students enrolled

Mathematics Faculty 12 full time 12 graduate students enrolled

Metallurgical Engineering Physical mineral dressing, theoretical, corrosion, surfaces, solids, spectroscopic analysis X ray crystallography Faculty 9 full time 14 graduate students enrolled

Mineralogy Petrology, optical mineralogy crystallography, geochemistry, volcanology, X ray diffraction and crystallography Faculty 3 full time, 9 graduate students enrolled

Mining Engineering Mine plant design, ventilation, administration fires and explosions, geochemical prospecting Faculty 4 full time 8 graduate students enrolled

Music Vocal, instrumental, theory and composition, musicology Faculty 16 full time 14 graduate students enrolled

Pharmacology Pharmacodynamics pharmacognosy pharmaceutical chemistry Faculty 15 full time 9 graduate students enrolled

Philosophy Prerequisites qualifying examination, including history, value theory metaphysics epistemology logic, and scientific method social historical, and religious philosophy Faculty 6 full time 5 graduate students enrolled

Physics Astronomy, theoretical statistical, and quantum mechanics, spectroscopy, electrodynamics nuclear physics X ray diffraction, crystallography, crystal structure, molecular spectra Prerequisite undergraduate degree in physics Faculty 10 full time 21 graduate students enrolled

Political Science International relations or organization, law, political theory and methodology, politics and public administration public law and American government, comparative government, Program satisfies requirement for the Graduate Certificate in Public Administration Faculty 8 full time 14 graduate students enrolled

Psychology General psychology—theory and history, child psychology and human development, clinical psychology and mental testing, personality and social psychology, counseling and guidance, experimental psychology, psychological and comparative psychology, personnel, industrial and applied psychology, psychological statistics Faculty 11 full time 14 graduate students enrolled

Secondary Education Faculty 5 full time 10 graduate students enrolled

Sociology General sociology, social psychology, marriage and the family, social disorganization and social work, research and methodology Faculty 9 full time 3 graduate students enrolled

Speech General speech, theatre and ballet, speech science and pathology voice science radio and television speech and hearing correction Faculty 21 full time 33 graduate students enrolled

Zoology Vertebrate, invertebrate, entomology, ecology, limnology parasitology embryology Administered by Biological Science Group Faculty 19 full time, 3 part time. 24 graduate students enrolled

Utah State University of Agriculture and Applied Science

LOGAN, UTAH

School of Graduate Studies

Chartered in 1888 the University opened two years later as Utah's land grant institution. It includes the Agricultural Experiment Station, the Extension Service and two branch colleges—Snow College at Ephraim, College of Southern Utah, at Cedar City. Graduate work in all departments is supervised by a graduate council.

Men and women Summer and evening courses 5 Ph.D.s awarded in 1956-7

Residence requirement for doctorate at least one year must be spent in residence

Transfer students must show letter of recommendation from major professor at previous school

ADMISSION REQUIREMENTS

Bachelor's degree, 3 letters of recommendation, acceptance by major departments, GRE

Apply at least 60 days before beginning of quarter student plans to enter

FEES AND FIRST YEAR AID

Tuition—\$60, \$58, \$57 per quarter for in state, \$95, \$93, \$92 for out-of state Room—\$445 per year for men, \$365 for women. Board—\$60 per month.

FIELDS OF STUDY FOR THE PH.D.

Agronomy Soil chemistry, soil physics, soils and irrigation. Combined program with soils and irrigation Prerequisites calculus, statistics, inorganic, quantitative, and physical chemistry, comprehensive written and oral examinations, M.S., with letters of recommendation Faculty 9 full time, 8 part time 8 graduate students enrolled

Animal Husbandry Animal nutrition, animal production Prerequisites mathematics through trigonometry, quantitative analysis, in addition to a full year of basic inorganic chemistry a full year of biology, including vertebrate and invertebrate zoology, the equivalent of 30 quarter hours of animal science, successful scores on departmental entrance examinations Recommended physics, calculus, quantitative analysis Faculty 8 full time, 2 part time 5 graduate students enrolled

Biochemistry and Nutrition Effects of toxic and non toxic substances in digestion and metabolism of farm animals, atmospheric pollution, nutritional status of population groups, basic physiological processes related to nutrition Prerequisites general chemistry, mathematics through calculus, physics basic courses in bacteriology, botany, physiology zoology Faculty 9 full time 3 graduate students enrolled

Botany and Plant Pathology Plant physiology, plant pathology Combined program with Agronomy Department offered. Prerequisite B.S. in botany, or closely allied field Faculty 6 full time, 4 part time 1 graduate student enrolled

Civil and Irrigation Engineering Irrigation and drainage Prerequisites graduation from an accredited engineering school, at least a "B" average in the undergraduate program Faculty 12 full time, 6 part time 3 graduate students enrolled

Horticulture Plant breeding Combined program with Departments of Agronomy and Botany Prerequisites genetics, general course in plant breeding, general courses in botany, plant physiology, plant pathology, plant anatomy Recommended technical writing, general courses in production of crops, including soil fertility Faculty 4 full time, 1 part time 1 graduate student enrolled

Range Management Range livestock nutrition, watershed management, range ecology game livestock competition. Combined program with Animal Husbandry Department in livestock nutrition Prerequisites BS in range management, animal husbandry agronomy, or equivalent, standing in upper 30 per cent of class, one language—generally French, German, Spanish. Faculty 3 full time 2 part time 5 graduate students enrolled.

Sociology Leadership groups and group relationships, population problems, social organization, participation and identification in organizations, urbanization, family Prerequisites 45 credit in sociology, with emphasis upon theory, social organization, social statistics, problems, cultural anthropology and family master's in sociology Faculty 6 full time 2 graduate students enrolled.

Wildlife Management Fishery, biology, animal ecology limnology, game management. Programs may include minors in botany, zoology range management, forestry Prerequisites BS in sociological science, field experience in biological science Faculty 4 full time, 2 part time 29 graduate students enrolled

Zoology Entomology, Physiology Agricultural entomology parasitology Combined program in genetics in association with Agronomy, Chemistry, Animal Husbandry, and other departments Prerequisites basic courses in zoology, botany chemistry physics, and mathematics Faculty 8 full time 5 graduate students enrolled

Vanderbilt University

NASHVILLE, TENNESSEE

Vanderbilt Graduate School

Graduate instruction has been part of the program since the founding of the University in

1875 The first degree was awarded in 1879

The University is privately endowed and co-educational. It has a residence hall for graduate and professional men, a residence hall for women is planned It is part of the University Center in Nashville, which includes four other institutions

Institutes of (1) Research and Training in the Social Sciences, and (2) Economic Development, new Dyer Observatory The University is affiliated with Oak Ridge Institute of Nuclear Studies, the Bill Wilkerson Hearing and Speech Foundation, Peabody College for Teachers, and Scarritt College for Christian Workers The last two affiliations are part of a program of cooperation in the service of higher education

Men and women Summer courses 44 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate three academic years of graduate study in residence

B average in graduate study required of transfer students

ADMISSION REQUIREMENTS

Bachelor's degree from approved institutions, with overall average of B and not less than B average in courses leading to graduate concentration Non graduates of Vanderbilt must have completed courses of study approximately equivalent to those of the University

MAT required. Recommended GRE Apply between October 1 and June 1 (in larger departments) to the Graduate School.

FEES AND FIRST YEAR AID

Tuition—\$540 for the academic session of 9 to 13 hours Over or under 9 13 hours—\$30 per semester hour, \$75 minimum Room—\$75 to \$135 per semester Board—approximately \$2 per day

Scholarships ranging from \$500 to \$1,500, plus tuition, assistantships from \$300 to \$1,500 Apply between October 1 and February 15 to the Graduate School.

FIELDS OF STUDY FOR THE PH.D.

Anatomy Histology, neuroanatomy, neurophysiology, hematology Prerequisites biology I, physics I, general chemistry, organic chemistry Recommended courses in embryology and comparative anatomy Faculty 3 full time.

Biochemistry Metabolism, nutrition, physical

Biochemistry Prerequisites general chemistry, qualitative and quantitative analysis organic chemistry, one course in physics Prerequisites or co requisites physical chemistry and mathematics through calculus Faculty 9 full time, 1 part time 6 graduate students enrolled

Biology Bacteriology, botany, and zoology Prerequisites undergraduate major in biology, preferably fundamental work in zoology, botany and bacteriology Recommended chemistry (preferably through organic), a year course in physics Faculty 9 full time 17 graduate students enrolled

Chemistry Inorganic analytical organic and physical chemistry A thesis program directed jointly by professors from the Chemistry Department and another department, such as Pharmacology or Biochemistry Prerequisites at least 1 year of inorganic analytical organic and physical chemistry (one year of calculus and one of physics are prerequisites for physical chemistry) German for the M.A. Faculty 9 full time 33 graduate students enrolled

Economics Business Administration Economics of agriculture organization and control of industry, labor and social security, international economics economic fluctuations, public finance public utilities and transportation economic development, econometrics Prerequisites bachelor's degree in economics, course in intermediate economic theory Faculty 14 full time, 1 part time 19 graduate students enrolled

English Literature of the following periods and areas Old English, Middle English Renaissance, Neo classic, 19th century, American Southern, 20th century English and American, the English language, the American language Prerequisites a reasonable undergraduate major in English, proficiency in composition one foreign language Faculty 10 full time, 1 part time 49 graduate students enrolled

History United States English (especially the 17th century), Brazil, modern European (especially diplomatic) Prerequisites no formal and inflexible list of required courses, but asumption that applicant will have an undergraduate major in history Faculty 11 full time, 1 part time 33 graduate students enrolled

Mathematics Geometry, abstract algebra topology, analysis Prerequisites mathematics courses through intermediate calculus, plus some of the following differential calculus, matrix the

ory, theory of equations, projective geometry, advanced calculus, introduction to modern algebra Faculty 9 full time, 4 part time 10 graduate students enrolled

Microbiology Virology, medical microbiology Prerequisites chemistry, physics, bacteriology Recommended experience in clinical bacteriology Faculty 4 full time 5 graduate students enrolled

Pharmacology Research offered in antimetabolites, barbiturates, auricular fibrillation, nucleoproteins, and cancer chemotherapy Prerequisites major in biology or chemistry (preferably a master's degree) Recommended advanced organic chemistry, mathematics through calculus, physical chemistry Faculty 6 full time 5 graduate students enrolled

Physics and Astronomy Nuclear physics, ultrasonics, molecular spectroscopy, astronomy (photoelectric photometry and galactic structure) Prerequisites undergraduate major of 26 hours or more, mathematics through differential calculus Recommended some work in chemistry, mathematics beyond differential equations Faculty 12 full time 63 graduate students enrolled

Physiology Prerequisites undergraduate major in biology or chemistry, courses in both fields Faculty 4 full time 1 graduate student enrolled

Political Science Political theory and methodology, international politics, public administration political behavior and organization public law Combined program calls for a minor field of 18 hours in other departments (social science etc.), or equivalent course time in two or more social sciences relevant to the major program Faculty 8 full time 11 graduate students enrolled

Psychology General experimental physiological social, clinical, counseling, industrial Prerequisites an undergraduate major in psychology (under certain conditions a minimum of 12 semester hours is accepted) Recommended biology mathematics sociology Faculty 9 full time 37 graduate students enrolled

Religion Biblical studies, theological studies historical studies Combined program with philosophy and history Prerequisites liberal arts degree a B.D., or its equivalent is also desirable Faculty 10 full time 42 graduate students enrolled

Sociology Social psychology, research meth

Horticulture Plant breeding Combined program with Departments of Agronomy and Botany Prerequisites genetics, general course in plant breeding, general courses in botany, plant physiology, plant pathology, plant anatomy Recommended technical writing, general courses in production of crops, including soil fertility Faculty 4 full time, 1 part time 1 graduate student enrolled

Range Management Range livestock nutrition, watershed management, range ecology game livestock competition Combined program with Animal Husbandry Department in livestock nutrition. Prerequisites BS in range management, animal husbandry, agronomy, or equivalent standing in upper 30 per cent of class, one language—generally French, German Spanish Faculty 3 full time 2 part time 5 graduate students enrolled

Sociology Leadership groups and group relationships, population problems, social organization, participation and identification in organizations, urbanization family Prerequisites 45 credits in sociology, with emphasis upon theory, social organization social statistics problems, cultural anthropology and family, master's in sociology Faculty 6 full time 2 graduate students enrolled

Wildlife Management Fishery, biology animal ecology, limnology game management Programs may include minors in botany, zoology, range management, forestry Prerequisites BS in sociological science, field experience in biological science Faculty 4 full time 2 part time 29 graduate students enrolled

Zoology Entomology Physiology Agricultural entomology parasitology Combined program in genetics in association with Agronomy, Chemistry, Animal Husbandry, and other departments Prerequisites basic courses in zoology, botany, chemistry, physics and mathematics Faculty 8 full time 5 graduate students enrolled

Vanderbilt University

NASHVILLE, TENNESSEE

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Residence requirement for doctorate three academic years of graduate study in residence

B average in graduate study required of transfer students

ADMISSION REQUIREMENTS

Bachelor's degree from approved institutions, with overall average of B and not less than B average in courses leading to graduate concentration Non graduates of Vanderbilt must have completed courses of study approximately equivalent to those of the University

MAT required Recommended GRE Apply between October 1 and June 1 (in larger departments) to the Graduate School

FEES AND FIRST YEAR AID

Tuition—\$540 for the academic session of 9 to 13 hours Over or under 9-13 hours—\$30 per semester hour, \$75 minimum Room—\$75 to \$135 per semester Board—approximately \$2 per day

Scholarships ranging from \$500 to \$1,500, plus tuition, assistantships from \$300 to \$1,500 Apply between October 1 and February 15 to the Graduate School

FIELDS OF STUDY FOR THE PH.D.

Anatomy Histology, neuroanatomy, neurophysiology, hematology Prerequisites biology I, physics I, general chemistry, organic chemistry Recommended courses in embryology and comparative anatomy Faculty 3 full time

Biochemistry Metabolism, nutrition, physical

Biochemistry Prerequisites general chemistry, qualitative and quantitative analysis, organic chemistry, one course in physics Prerequisites or co-requisites physical chemistry and mathematics through calculus Faculty 9 full time, 1 part time 6 graduate students enrolled

Biology Bacteriology, botany, and zoology Prerequisites undergraduate major in biology, preferably fundamental work in zoology botany and bacteriology Recommended chemistry (preferably through organic), a year course in physics Faculty 9 full time 17 graduate students enrolled

Chemistry Inorganic, analytical, organic and physical chemistry A thesis program directed jointly by professors from the Chemistry Department and another department, such as Pharmacology or Biochemistry Prerequisites at least 1 year of inorganic, analytical, organic, and physical chemistry (one year of calculus and one of physics are prerequisites for physical chemistry), German for the M.A. Faculty 9 full time 33 graduate students enrolled

Economics Business Administration Economics of agriculture, organization and control of industry, labor and social security international economics economic fluctuations, public finance public utilities and transportation economic development, econometrics Prerequisites bachelor's degree in economics, course in intermediate economic theory Faculty 14 full time, 1 part time 19 graduate students enrolled

English Literature of the following periods and areas Old English, Middle English Renaissance, Neo classic, 19th century, American, Southern, 20th century English and American the English language the American language Prerequisites a reasonable undergraduate major in English, proficiency in composition, one foreign language Faculty 10 full time, 1 part time 49 graduate students enrolled

History United States, English (especially the 17th century), Brazil, modern European (especially diplomatic) Prerequisites no formal and inflexible list of required courses, but as assumption that applicant will have an undergraduate major in history Faculty 11 full time, 1 part time 33 graduate students enrolled

Mathematics Geometry, abstract algebra topology, analysis Prerequisites mathematics courses through intermediate calculus plus some of the following differential calculus, matrix the

ory, theory of equations, projective geometry, advanced calculus, introduction to modern algebra Faculty 9 full time, 4 part time 10 graduate students enrolled

Microbiology Virology, medical microbiology Prerequisites chemistry, physics, bacteriology Recommended experience in clinical bacteriology Faculty 4 full time 5 graduate students enrolled

Pharmacology Research offered in antimetabolites, barbiturates, auricular fibrillation, nucleoproteins, and cancer chemotherapy Prerequisites major in biology or chemistry (preferably a master's degree) Recommended advanced organic chemistry, mathematics through calculus, physical chemistry Faculty 6 full time 5 graduate students enrolled

Physics and Astronomy Nuclear physics ultrasonics, molecular spectroscopy, astronomy (photoelectric photometry and galactic structure) Prerequisites undergraduate major of 26 hours or more, mathematics through differential calculus Recommended some work in chemistry, mathematics beyond differential equations Faculty 12 full time 63 graduate students enrolled

Physiology Prerequisites undergraduate major in biology or chemistry, courses in both fields Faculty 4 full time 1 graduate student enrolled

Political Science Political theory and methodology, international politics, public administration political behavior and organization public law Combined program calls for a minor field of 18 hours in other departments (social science, etc.), or equivalent course time in two or more social sciences relevant to the major program Faculty 8 full time 11 graduate students enrolled

Psychology General, experimental, physiological, social, clinical, counseling, industrial Prerequisites an undergraduate major in psychology (under certain conditions a minimum of 12 semester hours is accepted) Recommended biology, mathematics, sociology Faculty 9 full time 37 graduate students enrolled

Religion Biblical studies, theological studies historical studies Combined program with philosophy and history Prerequisites liberal arts degree a B.D. or its equivalent, is also desirable Faculty 10 full time 42 graduate students enrolled

Sociology Social psychology, research meth

ods, social organization (particularly community), population and human ecology Prerequisites elementary social statistics, introduction to field research, introduction to and advanced social psychology, social organization, cultural anthropology, introduction to population and human ecology Recommended mathematics through calculus Faculty 6 full time 9 graduate students enrolled.

NOTES

Vanderbilt Program for the Preparation of College Teachers is a four year program designed to improve the quality of teaching and to produce better academic citizens This program adds two courses to the usual requirements and provides for the supervision of teaching

University of Virginia

CHARLOTTESVILLE VIRGINIA

Graduate School of Arts and Sciences

First post graduate department was instituted in 1859 The Ph.D. was offered in 1880 and first awarded in 1885

Living quarters are provided for men and women Graduate Students Center for meetings and social occasions

Art museum, observatory, Institute for Economics and Social Theory, Institute on International Relations, Mountain Lake Biological Station, experimental farm with facilities for nuclear radiation of plants, two Van de Graaff generators, a nuclear reactor

Men and women Summer courses at M.A. level only 36 Ph.D. s awarded in 1956-7

Residence requirement for doctorate at least two full sessions of graduate work must be done in residence at this University

ADMISSION REQUIREMENTS

Bachelor's degree, GPA for last two undergraduate sessions of at least B (or equivalent), favorable recommendation of department chairman, undergraduate course satisfactory as to content, academic credits must have been earned within ten years of date of application

Reading knowledge of French and German

by the time of admission, otherwise this must be acquired during graduate studies

GRE, if recommended by department

Apply prior to August 1 to Dean of the Graduate School of Arts and Sciences

FEES AND FIRST YEAR AID

Tuition—in state \$294, out of state \$524 Room—men, \$175 to \$250, women, \$250 \$275

45 DuPont Fellowships with stipends of \$750 to \$1,200, plus the tuition fee, others up to \$500 Apply between November 1 and February 28 to Office of the Dean of the Graduate School of Arts and Sciences Limited number of assistantships, research grants etc., from \$200 to \$1,800 Apply to Chairman of Department

FIELDS OF STUDY FOR THE PH.D.

Anatomy Prerequisites Only students who plan to work toward the Ph.D. admitted, a thorough grounding in general biology Faculty 5 full time

Astronomy Prerequisites major in astronomy, background in mathematics and physics Faculty 3 full time 2 graduate students enrolled

Biochemistry Only students who plan to work toward the Ph.D. admitted Prerequisites a thorough grounding in chemistry physics, biology, and mathematics Faculty 4 full time

Biology General biology, botany, and zoology Prerequisites a major in biology, certain background courses in chemistry, geology, and physics (general knowledge of related sciences) Faculty 12 full time 27 graduate students enrolled

Chemistry Analytical, organic, physical or organic, physical, and theoretical chemistry Prerequisites a major in the field of chemistry, background in several fields (inorganic, organic, analytical, etc.) After admission the student takes a written examination in the above fields Faculty 13 full time 40 graduate students enrolled

Classics Latin and Greek literature Combined program with Department of Romance Languages (with special permission) Prerequisites a major in classics, 12 semester hours of specified courses are prerequisite to Greek Faculty 3 full time 2 graduate students enrolled

Economics Economic theory, monetary theory, international economics economic growth, and public finance Prerequisites background

courses in economics and commerce Faculty 8 full time, 1 part time 30 graduate students enrolled

Education Prerequisites a major in education, certain background courses in psychology Faculty 13 full time, 2 part time 22 graduate students enrolled

English English and American literature Certain courses in rhetoric, Gothic, and Old Icelandic may be included in the degree program Prerequisites a major in the field of English, some knowledge of Latin Faculty 8 full time 41 graduate students enrolled

History American and European Prerequisites a major in history, certain background courses in economics and political science Faculty 8 full time 40 graduate students enrolled

Mathematics Topology Prerequisite major in the field of mathematics Faculty 8 full time, 1 part time 18 graduate students enrolled

Microbiology Prerequisites thorough background in biology and chemistry Faculty 5 full time 3 graduate students enrolled

Pharmacology Prerequisites only students who plan to work toward the Ph D admitted, undergraduate courses in biology, chemistry or physics, a general background in the three fields Faculty 3 full time 1 graduate student enrolled

Philosophy Prerequisites 18 semester hours of undergraduate philosophy Faculty 7 full time 11 graduate students enrolled

Physics Prerequisites a major in the field of physics, certain background courses in mathematics Faculty 8 full time 48 graduate students enrolled

Physiology Prerequisites only students who plan to work toward the Ph D admitted, a thorough grounding in biology chemistry and physics, a first year course in mathematics Faculty 3 full time 2 part time

Political Science American government comparative government, and international relations Prerequisites at least 12 semester hours (or equivalent) of undergraduate courses in political science including at least 6 semester hours in the corresponding field Faculty 3 full time, 3 part time 11 graduate students enrolled

Psychology Experimental psychology Faculty 7 full time 11 graduate students enrolled

Romance Languages French, Spanish, Italian Prerequisites a major in Romance languages, undergraduate course work beyond the third year

for each area Faculty 9 full time 11 graduate students enrolled

Virginia Polytechnic Institute

BLACKSBURG, VIRGINIA

The Graduate School

Graduate work was started in the 1880s leading to the conferral of professional degrees in engineering in 1885 and to the first MS in 1892. Doctoral work was started in 1940 and the first degree conferred in 1942. VPI is a land grant college under state control, with graduate work administered by a Director of Graduate Studies and a Committee on Graduate Programs and Degrees.

Summer courses available 10 Ph D's awarded in 1956-7

Residence requirements for doctorate minimum of three academic years beyond the baccalaureate degree one year before the final year must be spent in residence at VPI, final year must be spent in registration at VPI and work completed under the supervision of the student's VPI faculty committee.

Up to one year of work toward the Ph D can be transferred from another recognized graduate school, with the exact amount depending upon the fitness of the work for the VPI program.

ADMISSION REQUIREMENTS

Bachelor's degree from an institution whose standards are equivalent to those of VPI. A committee consisting of the Director of Graduate Studies, Director of Admission, and Head of the major department grants admission.

Student must demonstrate ability to read French and German (or two languages other than English in the field of his specialization) to the satisfaction of the Department of Foreign Languages.

Recommended GRE

Apply to Director of Graduate Studies at least one month before the opening of the quarter for which enrollment is desired.

FEES AND FIRST YEAR AID

Tuition—In state \$77 per quarter, out of state \$153 Room and board for men and women \$150 per quarter when available on campus

Several graduate and research assistantships paying up to \$160 per month are available, a few fellowships in certain departments Apply to Director of Graduate Studies normally before March 20 for the next year However applications are received at other times since vacancies occur during the year

FIELDS OF STUDY FOR THE PH D

Applied Mechanics Mechanics of solids fluid mechanics dynamics and vibration Prerequisites BS and MS in engineering or BS in physics or mathematics and MS in applied mechanics German and French or Russian minimum B average on MS Faculty 8 full time 6 part time 14 graduate students during academic year 20 during summer

Biology Animal pathology bacteriology botany biochemistry entomology genetics zoology Prerequisites general analytical and organic chemistry botany zoology algebra trigonometry physics English BS degree reasonably good academic record GRE desirable Recommended analytical geometry calculus genetics Members of the staff have connections with the Virginia Agricultural Experiment Station thus making available excellent equipment for scientific research This connection also provides financial assistance to graduate students in the form of research assistantships to staff members doing work at the Station Faculty 20 full time 2 part time 16 graduate students enrolled

Chemical Engineering Fractional distillation liquid liquid extraction molecular distillation petrochemicals electroplating nuclear engineering, ultrasonics, organic synthesis processes plant design, waste treatment and utilization thermal diffusion gaseous diffusion Prerequisites BSc in chemical engineering or BSc in chemistry plus fundamental supporting courses in chemical engineering French and German (or special foreign language on request) preliminary written tests seminar in chemical engineering (any Graduate Unit) operations laboratory Faculty 5 full time 2 part time 18 graduate students enrolled.

Chemistry Organic physical, and high poly

mer chemistry Prerequisites BS and MS in chemistry, French and German (exceptions sometimes made in the case of foreign students) preliminary examinations covering the four fundamental fields of chemistry at least nine months before the degree is expected, final oral examination after thesis has been approved Faculty 16 full time 17 graduate students enrolled

Geographical Sciences Economic geology stratigraphy structural and general geology petrology invertebrate paleontology and geochemistry Prerequisites course work is assigned to eliminate any deficiencies determined by comprehensive examination, master's program must have been completed including a creditable thesis Faculty 6 full time, 1 part time 11 graduate students enrolled

Physics Nuclear physics solid state physics, nuclear engineering Special facilities include a 2 Mev nuclear accelerator a natural uranium experimental reactor nuclear counting and infrared spectroscopy laboratories Prerequisites equivalent of a BS in physics, French and German, written and oral comprehensive examination, oral final examination Published dissertation required Faculty 12 full time 1 part time 20 graduate students enrolled

Sanitary Engineering Water supply and treatment sewage collection treatment and disposal, biochemical aspects of water and waste water treatment public health engineering Departments of Biology and Chemical Engineering cooperate with the Division of Sanitary Engineering in administering the Ph D program. Prerequisites BS in engineering and acceptable academic records Recommended courses in collection distribution and treatment of water and sewage bacteriology, analytical chemistry Faculty 2 full time 3 graduate students enrolled

Statistics Mathematical statistics with emphasis in fields of stochastic processes sampling inference and experimental design Students from other departments may take minor in statistics Prerequisites BS or BA mathematics through advanced calculus scholastic standing in upper fifth of class German and French written preliminary examination at end of first or second year of graduate study Students are required to work in the statistical laboratory on applied problems at least one quarter before graduating students must have courses in function theory, in both real and complex variables and work in

modern algebra Faculty 9 full time 25 graduate students enrolled

NOTES

Nearly all doctoral candidates hold assistantships, thus acquiring good apprentice training for college teaching

State College of Washington

PULLMAN, WASHINGTON

The Graduate School

Although the institution was founded in 1890, no formal graduate program was organized until the 1920's. Just prior to World War II the growth was rapid. Located in a small city, the College is a residence institution with separate dormitory facilities for graduate students.

Agricultural experiment station, division of industrial research, computing center, bureau of economics and business research. Unusual opportunities for intimate professional relationships between students and members of the graduate faculty.

Men and women. Summer courses. Land grant institution. 36 Ph.D.'s awarded in 1956-7.

Residence requirement for doctorate: 32 semester hours of work must be completed in residence prior to the preliminary examination.

ADMISSION REQUIREMENTS

Recognized bachelor's degree, with B+ (3.0) average or better in last half of undergraduate work. An applicant can receive 'Provisional Student Status' with less than a 'B' average.

Apply to the Dean of The Graduate School at least one month prior to semester of proposed enrollment.

FEES AND FIRST-YEAR AID

Tuition—\$86 per semester for in state, \$156 for out-of state. Room—\$120 per semester. Board—\$185. Summer session fees are variable and are announced separately.

A first year, half time teaching or research appointment carries a stipend of \$1,650 for the academic year, and the student may enroll for ten credit hours of work per semester. Apply by

March 15, since most appointments are made by April 1.

FIELDS OF STUDY FOR THE PH.D.

Agricultural Economics Farm management, marketing of agricultural commodities, land economics, agricultural policies. Prerequisites: general economics, general agriculture, economic theory, statistics, farm management, marketing policies, successful scores in reading examinations in two of the following—German; French or Spanish (either, but not both), Russian. Recommended: additional mathematics, economics, and technical agriculture. Faculty: 10 full time, 1 part time. 4 graduate students enrolled.

Agronomy Farm crops and soil science. Prerequisites: forage crops, grain crops, weeds, crop breeding, general plant pathology, introductory plant physiology, elementary organic chemistry, elementary quantitative analysis, intermediate algebra, soils (7 hours), successful scores in reading examinations in two of the following—German, French or Spanish (either, but not both), Russian. Faculty: 16 full time, 4 part time. 22 graduate students enrolled.

Animal Science Animal nutrition, applied genetics, dairy manufacturing. This is an interdepartmental program offered by Animal Science, Dairy Science, and Poultry Science. Prerequisites: general agriculture, nutrition and/or genetics, general zoology, quantitative analysis, organic chemistry, intermediate algebra, successful scores in reading examinations in two of the following—German, French or Spanish (either, but not both), Swedish. Faculty: 22 full time, 1 part time. 32 graduate students enrolled.

Bacteriology Medical bacteriology in selected areas. Prerequisites: general microbiology, medical bacteriology and epidemiology, general chemistry, quantitative analysis, organic chemistry, introductory botany, introductory zoology, successful scores in reading examinations in two of the following—German, French, Russian. Faculty: 8 full time. 11 graduate students enrolled.

Botany Plant physiology, genetics, systematic botany, ecology. Prerequisites: general botany, introductory plant physiology, organic chemistry, microtechnique, genetics, successful scores in reading examinations in two of the following—German, French or Spanish (either, but not both), Swedish. Faculty: 7 full time. 9 graduate students enrolled.

Chemistry Physical and inorganic chemistry, organic and biochemistry Prerequisites completion of courses totaling 40 semester hours of chemistry including inorganic, quantitative organic, and physical chemistry, 8 hours of physics, mathematics through calculus, successful scores in reading examinations in two of the following German, French, Russian qualifying examination at registration time Faculty 21 full time, 2 part time 25 graduate students enrolled

Education Educational administration and curriculum Prerequisites requirements leading to certification, teaching experience, successful scores in reading examinations in two of the following German French or Spanish (either, but not both), Swedish, qualifying examination prior to submission of advanced degree program Ed D also offered in this field Faculty 23 full time, 1 part time 49 graduate students enrolled

Entomology Systematic and economic entomology Prerequisites systematic biology, introductory entomology, organic chemistry, successful scores in reading examinations in two of the following French German, Russian Faculty 11 full time, 4 part time 9 graduate students enrolled

Food Technology Microbiology and processing This is an interdepartmental program of Animal Science Poultry Science, Foods and Nutrition, Dairy Science, Horticulture Prerequisites general chemistry, organic chemistry quantitative analysis, general microbiology, mathematics physics, successful scores in reading examinations in two of the following German French or Spanish (either, but not both), Swedish Faculty 17 full time 10 graduate students enrolled

Genetics Fundamental genetics, applied plant and animal genetics Prerequisites 2 semesters of either botany or zoology, one semester of genetics 2 semesters of general chemistry, one semester of organic chemistry, one semester of physics, successful scores in reading examinations in two of the following German, French or Spanish (either, not both), Russian Faculty 10 full time, 1 part time 6 graduate students enrolled

Geology Stratigraphy and mineralogy Prerequisites general geology through historical geology, field methods and structures, one year each of chemistry physics, and mathematics, successful scores in reading examinations in two of

the following German, French, Russian, Swedish Faculty 4 full time 7 graduate students enrolled

History American, Northwest, and European history Prerequisites basic training in European English, and American history, related background in literature and social studies, successful scores in reading examinations in two of the following German, French or Spanish (either, but not both) Faculty 7 full time 4 graduate students enrolled

Horticulture Pomology Prerequisites plant physiology, general bacteriology, organic chemistry, quantitative analysis, fruit insects, successful scores in reading examinations in two of the following German French or Spanish (either, but not both) Faculty 11 full time 4 part time 14 graduate students enrolled

Mathematics Algebra, analysis, geometry, topology statistics and applied mathematics Prerequisites 12 semester hours beyond the calculus, successful scores in reading examinations in two of the following French, German Russian, Faculty 14 full time 3 graduate students enrolled

Pharmacy Pharmaceutical chemistry, pharmacy pharmacology Prerequisites bachelor's degree in pharmacy from this or another accredited school of pharmacy, successful scores in reading examinations in German and French Faculty 8 full time 9 graduate students enrolled

Physical Education Experimental physical education Prerequisites 30 hours of physical education, chemistry, psychology, mathematics, physics, zoology, successful scores in reading examinations in two of the following German, French Russian, Swedish Faculty 7 full time 19 graduate students enrolled

Physics Experimental, theoretical, biophysics Prerequisites general physics, mechanics, heat and thermodynamics, electricity and magnetism optics, atomic physics, differential equations, chemistry successful scores in reading examinations in two of the following German, French, Russian Faculty 7 full time 7 graduate students enrolled

Plant Pathology Mycology Prerequisites elementary botany, elementary zoology, physics, plant physiology, bacteriology, general plant pathology, entomology, college algebra, organic

chemistry, successful scores in reading examinations in two of the following German, French, Spanish, or Italian (one only from these) Faculty 6 full time, 10 part time 12 graduate students enrolled

Political Science Public administration and political theory Prerequisites 12 semester hours in political science and strong preparation in other social studies, successful scores in reading examinations in two of the following German, French or Spanish (either, but not both), Russian Faculty 5 full time 2 graduate students enrolled

Psychology Experimental, clinical, and general psychology Prerequisites general psychology, mental hygiene, statistics, experimental psychology—minimum total of 18 semester hours, successful scores in reading examinations in two of the following German, Russian, French, Swedish Faculty 11 full time 19 graduate students enrolled

Sociology General and rural sociology, and social statistics Prerequisites not less than 18 semester hours in sociology including elementary social statistics, successful scores in reading examinations in two of the following—German, French or Spanish (either, but not both), Swedish Faculty 16 full time 12 graduate students enrolled

Veterinary Science Veterinary microbiology and pathology Prerequisites organic chemistry, general physics, comparative vertebrate anatomy, comparative physiology, successful scores in reading examinations in two of the following—German, French or Spanish (either, but not both), Russian Faculty 25 full time 70 graduate students enrolled

Zoology Experimental embryology, zoophysiology, systematic zoology Prerequisites general zoology, systematic biology or histology, embryology, organic chemistry elementary mathematics, successful scores in reading examinations in two of the following French, German, Russian Faculty 10 full time 20 graduate students enrolled

NOTES

There are numerous teaching assistantships in which the appointees receive careful supervision in their work. Psychology 501 is a seminar in teaching psychology

University of Washington

SEATTLE, WASHINGTON

Graduate School

The Graduate School was formally organized in 1911 and is administratively in charge of graduate study in all divisions of the University

Museum of history and industry, art gallery, observatory, museum, Bureau of Business Research, Child Development Institute, Child Health Center, clinic for child study, Far Eastern and Russian Institute, Fisheries Research Institute, Friday Harbor Laboratories (zoology fisheries, oceanography), Bureau of Government Research, engineering experiment station, population research, psychiatric clinic for children, Institute of Public Affairs, research computer laboratory, public opinion laboratory, cosmic ray research laboratory

Men and women Summer courses in most areas 111 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate minimum of three academic years of residence study, two of the three at the University with at least one year in continuous, full time residence

ADMISSION REQUIREMENTS

For full standing—2.75 GPA or higher in senior year, for provisional standing—GPA between 2.5 and 2.75 in senior year Students with senior year GPA below 2.5 will not be admitted

No language requirement for admission to Graduate School Reading knowledge of two required for Ph.D.

Apply to Office of Admissions, University of Washington by July 15 for Fall session at least 30 days before opening of quarter for other sessions

FEES AND FIRST YEAR AID

Tuition—\$61 per quarter for in state \$136 for out of state Room and board—\$600 per year for men, \$540 \$630 for women

Teaching and research assistantships are available, these call for 20 hours of service Assistants receive \$175 per month, plus waiver of tuition and fees, and they must make normal progress toward an advanced degree Apply to department concerned Awards are usually made about March 15

FIELDS OF STUDY FOR THE PH D

Anatomy Submicroscopic anatomy, endocrinology Prerequisites college major in zoology, botany, chemistry, physics, anthropology or other appropriate field Faculty 10 full time, 3 part time 2 graduate students enrolled

Anthropology Ethnology, especially Western North America and Pacific Northwest, Melanesia and Oceania, linguistics, social anthropology, archaeology, especially Western North America and Pacific Northwest, physical anthropology Joint work is possible with a Far Eastern minor or a minor in sociology, etc Prerequisites general ethnology, little or no previous undergraduate work in anthropology needed for admission, but student in that case usually takes certain undergraduate courses as non credit background, knowledge of statistics equivalent to one basic course (by time of awarding of Ph D) Recommended background in sociology, psychology, history, and/or geography, in geology for archaeology specialists, in anatomy and serology for physical anthropology Faculty 8 full time 3 part time 25 graduate students enrolled

Biochemistry Physical and chemical studies of proteins, enzymes, and enzyme kinetics, carbohydrate, lipid, and nucleotide metabolism, protein synthesis, hormonal interactions, biological oxidations etc Prerequisites BA with a major in chemistry, or its equivalent, with some background in biology Biochemistry is desirable but not required Faculty 7 full time, 8 part time 19 graduate students enrolled

Botany Mycology, genetics plant physiology Prerequisites one year of general botany genetics, plant physiology, and 20 credits of electives in the field, organic chemistry Faculty 8 full time, 10 graduate students enrolled

Business Administration Policy and administration, production, personnel, accounting, finance, research and statistics, business and its environment, marketing, transportation, foreign trade, economics, business education Prerequisites MBA or equivalent, 3.25 GPA Faculty 65 full time, 10 part time 108 graduate students enrolled

Chemical Engineering Diffusion, heat transfer, flow of fluids, lignin and cellulose, ion exchange kinetics, fluidized beds Prerequisites BS in chemical engineering or its equivalent, 4 qualifying examinations (organic and physical chemistry, engineering fundamentals, unit opera-

tions) Faculty 5 full time, 2 part time 28 graduate students enrolled

Chemistry Analytical, inorganic, organic, nuclear, and physical chemistry Combined program offered with Departments of Biochemistry and Chemical Engineering Prerequisites bachelor's degree in science, preferably in chemistry, German and French, or Russian, qualifying or entrance examinations Faculty 18 full time 110 graduate students enrolled

Civil Engineering Hydraulics and fluid mechanics, sanitary engineering, soil mechanics, structural engineering, transportation engineering Prerequisite bachelor's or master's in civil engineering Faculty 26 full time, 2 part time 38 graduate students enrolled

Economics General theory, history of economic thought, money, banking and cycle, government regulation and public utilities, labor, public finance, international economics, economic history, statistics and econometrics, national economies Joint program offered with Far Eastern and Russian Institute Prerequisites the equivalent of an undergraduate major in economics, no specified required courses, but in practice the graduate student usually covers deficiencies by auditing credit courses Faculty 17 full time 45 graduate students enrolled

Education Educational administration and supervision, educational methods, educational psychology, college teaching, curriculum, elementary education, guidance and counseling, history and philosophy of education, remedial and special education Prerequisites at least 20 quarter credits of background courses in education and the background courses required by the minor department, a minimum of 2 years of continuously successful teaching or administrative experience, at least 3.5 average on master's work Ed D also given in this field Faculty 12 full time, 3 part time 234 graduate students enrolled

Electrical Engineering Microwaves, computers, wave propagation and antennas, power line relaying, power system stability Prerequisites BS in electrical engineering, mathematics through differential equations, and an advanced course in field Students with BS in physics and mathematics may also be admitted, but must take many of the senior electrical engineering courses in addition to the regular Ph D program. Students with BS in other fields of engineering may enter under these same conditions Faculty 21

full time, 7 part time 81 graduate students enrolled

English Literary history, literary criticism, rhetoric, language General and comparative literature is a combined program offered with Romance Languages, or German, or Classics, or Scandinavian, or Far East Departments Prerequisites 50 quarter hours of literature courses (BA requirements), course work in Middle English, Shakespeare, 17th or 18th century, early or late 19th century American literature Faculty 57 full time, 44 part time 125 graduate students enrolled

Far Eastern and Slavic Languages and Literature Chinese language and literature, Russian language and literature, history, anthropology, economics, political science Combined programs offered with Departments of History, Anthropology, Economics, Political Science, Geography Prerequisites undergraduate degree in social sciences or humanities with high academic record, thorough knowledge of the area Recommended foreign travel, languages Faculty 12 full time, 6 part time. 15 graduate students enrolled

Forestry Forest management—soils, tree nutrition, forest ecology, silviculture, influences, mensuration, management, recreation, photography and policy, forest products—basic wood technology, plywood, gluing, synthetic boards, mechanical properties, and saw milling Prerequisites degree in forestry or related field Faculty 12 full time 8 graduate students enrolled

Geography Regional fields North America Asia (including U S S R.), systematic fields economic geography, urban geography, political geography Admission is based on academic record or demonstrated qualities of scholarship Faculty 10 full time, 1 part time 25 graduate students enrolled

Geology Petrography, stratigraphy, paleontology, ore deposits Prerequisites approximately 50 credits in geology, French and German Recommended summer field experience with US Geological Survey or private company Faculty 7 full time, 1 part time 40 graduate students enrolled

Germanics Germanics, linguistics, philology, and literature Combined program offered with other language department in linguistics and comparative literature Prerequisites equivalent to undergraduate major, 40 credits of courses

beyond elementary German, reading knowledge of one language other than German preferably French sometimes Latin Faculty 10 full time, 5 part time 8 graduate students enrolled

History Ancient history, medieval history, modern European, English, British Empire, United States, Far Eastern Combined program offered with Far Eastern and Russian Institute (Chinese, Japanese, and Russian history) Prerequisites undergraduate history major, or the equivalent Students majoring in Far Eastern history may substitute a Far Eastern language or Russian for either French or German Faculty 12 full time, 4 part time 73 graduate students enrolled

Linguistics Descriptive and historical linguistics Staff, courses, and seminars are nominally in various departments, principally Anthropology, Far Eastern, and Germanics Interdepartmental Linguistics has no staff or courses as such Prerequisites German and French (no substitute), screening 4 graduate students enrolled

Mathematics Mathematics and statistics Prerequisites 22 quarter credits (or 16 semester credits) in mathematics courses beyond calculus Recommended 35 or more quarter credits, 24 or more semester credits in mathematics beyond calculus, one or more languages, general physics Faculty 30 full time, 27 part time 61 graduate students enrolled

Meteorology and Climatology Large scale and small scale meteorology, instrument development, bioclimatology Students may take part of their work in oceanography, physics, geology and engineering Prerequisites physics and mathematics courses Recommended meteorology and/or field experience Faculty 5 full time 18 graduate students enrolled

Microbiology Virology, physiology, genetics Prerequisites in general, a B S in microbiology, biology, or chemistry with a 'B' average Faculty 9 full time 20 graduate students enrolled

Music Musicology, theory and composition Prerequisites undergraduate degree comprising the equivalent of all courses currently required at this institution for a major in either music history and literature or composition, French and German, plus other languages pertinent to candidate's field, competence in some branch of musical performance Recommended college teaching experience prior to doctoral study Faculty 30 full time, 10 part time 32 graduate students enrolled

Oceanography Physical, chemical, biological and geological oceanography Prerequisites bachelor's degree in oceanography or in one of the physical or biological sciences, general background in basic sciences Faculty 6 full time 15 graduate students enrolled

Pharmacology Psychopharmacology, cardiovascular mechanisms, cellular pharmacology, detoxication mechanisms, histamine and serotonin gastro intestinal and liver pharmacology Prerequisites general examination, examination and evaluation of past courses Faculty 5 full time, 4 part time 6 graduate students enrolled

Pharmacy Pharmaceutical chemistry pharmacognosy Prerequisites graduation from a college of pharmacy or school with closely allied major, GPA of 2.75 during senior year Recommended basic courses in organic chemistry physics, pharmaceutical chemistry microbiology, pharmacology, and physiology, one year of analytical geometry and calculus Faculty 9 full time, 1 part time 13 graduate students enrolled

Philosophy Ethics, epistemology, metaphysics history of philosophy, logic, philosophy of religion aesthetics Prerequisites generally the equivalent of an undergraduate major in philosophy, however, students with masters in other departments sometimes acceptable Recommended upper division or graduate level courses in metaphysics, epistemology, logic, ethics, and history of philosophy Faculty 7 full time 24 graduate students enrolled

Physics Cosmic rays, gaseous electronics, high energy scattering, magnetic resonance, nuclear reactions, nuclear spectroscopy, optical spectroscopy, solid state physics, theoretical physics Prerequisites classical mechanics, electricity and magnetism, the properties of matter, atomic physics, nuclear physics, advanced calculus, differential equations Russian may constitute one of the required languages Recommended mathematical physics Faculty 22 full time 85 graduate students enrolled

Physiology and Biophysics Mammalian and pathological physiology, biophysics, psychoneurobiology, applied physiology with emphasis on environmental stresses and human engineering Prerequisites biophysics—B.S. in mathematics or physics, psychoneurobiology—B.S. in psychology, physiology—B.S. in zoology, biology, psychology, physics, chemistry, electrical engineering, mathematics, or an M.D. Recommended

advanced physics and mathematics, histology and histochemistry or advanced psychology, depending on the area of concentration Faculty 8 full time, 3 part time 11 graduate students enrolled

Political Science Political theory international law and foreign policy, international organization, comparative government, public law, public administration, American government and politics, state and local government, Far Eastern or Russian political science Combined program with Far East Department is offered Faculty 11 full time, 1 part time 63 graduate students enrolled

Psychology Experimental, child development, clinical, comparative physiological, public opinion analysis, social, quantitative psychological analysis Prerequisites 30 quarter credits of undergraduate psychology courses including general, advanced general, statistical methods, psychology of learning MAT required Recommended credits in biological sciences, 10 quarter credits in college mathematics, 20 quarter credits in social sciences other than psychology, senior year GPA 3.0 or higher Faculty 9 full time, 6 part time 76 graduate students enrolled

Romance Languages and Literature French, Spanish, Italian, and Romance linguistics Combined program with English Department in comparative literature is also offered Prerequisites undergraduate major (45 credits beyond the first year) in the major language, near native proficiency in major language, good knowledge of minor language Recommended German and Latin foreign travel or residence Faculty 16 full time, 10 part time 23 graduate students enrolled

Sociology Sociological theory, research methods and statistics, ecology and demography, social interaction, social institutions, social organization, social disorganization, and criminology Prerequisites introductory sociology, statistics, ecology or population, group behavior or social psychology, family or institutions plus electives in sociology to make 40 hours of credit, GRE Aptitude Test and Advanced Test in sociology Faculty 18 full time, 6 part time 48 graduate students enrolled

Speech Public address (including argument and discussion), speech correction (including experimental phonetics) Prerequisites total of 35 quarter hours of approved course work, Recom

mended undergraduate speech courses and/or activities in public speaking, acting, interpretation, etc Faculty 21 full time, 15 part time 23 graduate students enrolled

Zoology Vertebrate anatomy, vertebrate physiology, invertebrate taxonomy invertebrate morphology, ecology and limnology, protozoology, cellular physiology, entomology Prerequisites one year of college physics, chemistry through organic, elementary botany, genetics, general physiology, comparative vertebrate anatomy comparative vertebrate physiology, invertebrate zoology (Some of the last five required courses may be taken while doing graduate work, if other courses are offered upon admission) Faculty 11 full time, 2 part time 16 graduate students enrolled

Washington University

ST LOUIS, MISSOURI

Graduate School of Arts and Sciences

Established in 1898, the Graduate School administers the graduate work leading to the degrees of Master of Arts and Doctor of Philosophy as well as graduate professional degrees in Health and Physical Education, Counseling and Personnel, Speech and Hearing and Music Through the Graduate Institute of Education, it also administers the professional degrees of Master of Arts in Education and Ed D, as well as an Advanced Graduate Certificate in Education

Allied divisions offering doctoral degrees are Sever Institute of Technology, awarding the D Sc in various fields of engineering, George Warren Brown School of Social Work, awarding the Doctor of Social Work

Radiological institute, two electronic computers, statistical facilities for research in social science and other fields, facilities for research in radiochemistry, nuclear and paramagnetic resonance, optical spectroscopy, Beta and Gamma spectroscopy, X ray crystallography, low temperature studies physical electronics nuclear reactions, cyclotron, betatron, cosmic ray, cloud chamber and emulsions, and theoretical physics, laboratory facilities for X ray diffraction, spectrographic, differential thermal analysis and geo-

physical equipment There are numerous arrangements for research and study in the area

Men and women. Limited summer and evening courses 34 Ph D s awarded in 1956 7

Residence requirement for doctorate a minimum of three full years of graduate study, at least one full year shall be spent at this University

ADMISSION REQUIREMENTS

Graduates of institutions of recognized rank are eligible for unqualified admission, provided their transcripts show a reasonably well rounded undergraduate curriculum of studies and the completion of prerequisites of the departments in which they propose to study Undergraduate grades must be above the minimum requirements for the bachelor's degree, an average of B is the normal requirement

Apply to the Dean of the Graduate School well in advance of time set for registration

FEEES AND FIRST YEAR AID

Tuition—\$625 Room—men \$230, women \$600, includes breakfast and dinner and 3 meals on Sunday Board—men \$540 (estimate)

Scholarships and fellowships, in some departments graduate assistantships to assist in teaching or research. For scholarships and fellowships apply before March 1 to Dean of the Graduate School (with completed applications and all supporting materials), to chairman of department concerned for assistantships

FIELDS OF STUDY FOR THE PH D

Anatomy Prerequisites adequate foundation in comparative anatomy, embryology, general physiology, French and German M D is also awarded in this field Program administered by School of Medicine Faculty 10 full time 2 graduate students enrolled

Art and Archaeology Greek and Roman art and archaeology, Renaissance art, modern and contemporary art, art of the Far East Combined program with Departments of Classics, History and Philosophy Prerequisites at least 18 units of undergraduate work in art and archaeology, one foreign language Recommended two or more courses in European and American history Faculty 5 full time 9 graduate students enrolled

Audiology Physical and architectural acous

tics, electro acoustics, auditory biophysics, neuro physiology of audition, phycho acoustics, education of the deaf, speech and phonetics This is a combined program drawing upon nine other departments Prerequisites elementary courses in biology, physics, psychology, and mathematics Knowledge of the principles of inorganic and organic chemistry, including practice in the elements of volumetric analysis will be expected for students specializing in auditory biophysics and neurophysiology Faculty 9 full time, 9 part time 5 graduate students enrolled.

Bacteriology Medical bacteriology and immunology with applications to the mouth and other mucous membrane areas Prerequisites inorganic chemistry, qualitative and quantitative analysis, organic chemistry, physical chemistry, and physics, French and German D.D.S. also awarded in this field Program administered by School of Dentistry Faculty 2 full time, 2 graduate students enrolled

Biological Chemistry Intermediary metabolism and related problems, the mechanism of enzyme action, and hormonal regulation of enzyme activity Prerequisites general, analytical, organic, and physical chemistry and physics, ability to read French and German M.D. also awarded in this field Program administered by School of Medicine Faculty 5 full time 1 graduate student enrolled

Botany Physiology, taxonomy, genetics, mycology, and paleobotany Faculty 8 full time, 2 part time 18 graduate students enrolled

Chemistry Inorganic, analytical, organic, and physical chemistry, radiochemistry nuclear and paramagnetic resonance, spectroscopy, X ray crystallography, low temperature studies Prerequisites 24 units of undergraduate work in inorganic, analytical, physical, and organic chemistry, 6 units of physics, mathematics through integral calculus, German and French Faculty 12 full time, 1 part time 33 graduate students enrolled.

Classics Greek and Latin languages and literature, linguistics, ancient archaeology, history, and philosophy Prerequisite major in Greek or Latin or equivalent Combined program with Departments of Art and Archaeology, History, and Philosophy Faculty 7 full time 7 graduate students enrolled.

Economics International economics, labor economics, regional economic development Prereq

uisites adequate foundation in economic theory, economic history, and statistical inference Faculty 8 full time, 2 part time 12 graduate students enrolled

Education This field of study is offered by Graduate Institute of Education Ed.D. also awarded in this field Battery of tests specified by the Institute are required for admission Faculty 15 full time, 4 part time 197 graduate students enrolled

Electrical Engineering Networks and electro mechanics, servomechanisms and electrical power transmission, servomechanisms and electrical machinery, electronics, electro-acoustics, electronics communications Prerequisite good background in physics and mathematics D.Sc. also awarded in this field by Sever Institute of Technology Faculty 6 full time 1 graduate student enrolled.

English Conventional areas in English and American literature, rhetoric and public address in the area of speech Prerequisites 24 hours of upperclass courses in English and American literature Faculty 19 full time 43 graduate students enrolled.

Geology Geochemistry, geomorphology, geophysics, clay mineralogy, micropaleontology, engineering geology, petrogenesis, mineral deposits Prerequisites 18 hours of geology, a background of chemistry, mathematics, and physics, minimum of chemistry through quantitative analysis, mathematics through calculus, college physics normally required, French and German D.Sc. in geological engineering also awarded in this field Program administered by Sever Institute of Technology Faculty 8 full time, 1 part time 14 graduate students enrolled

German Prerequisites 18 units in German, including a general introduction to German literature, French and Latin Faculty 5 full time 2 graduate students enrolled

History American history western, recent, the South, intellectual, European institutional and social history of the 17th and 18th centuries, English modern Combined program with Departments of Art and Archaeology, Classics, and Philosophy Prerequisite 18 units of undergraduate work in history Faculty 7 full time 15 graduate students enrolled

Mathematics Principal branches with emphasis on topics in algebra and analysis, theory and practice of operation of electronic computer Pre

requisite thorough basic preparation in mathematics Faculty 14 full time 10 graduate students enrolled

Microbiology Prerequisites background should include calculus, physics, inorganic chemistry, qualitative and quantitative analysis, or organic chemistry, biological chemistry, physical chemistry, French and German M D also awarded in this field Program administered by School of Medicine Faculty 5 full time 4 graduate students enrolled

Music History and literature of music, analysis of harmony, form, style, and orchestration, written harmony and counterpoint Prerequisites strong background in music, with performance ability in at least one medium at an advanced level, French and German Ed D in Music Education also awarded in this field Program administered by Graduate Institute of Education Faculty 10 full time, 1 part time 30 graduate students enrolled

Pathology Experimental pathology Prerequisites histology, anatomy, biological chemistry, bacteriology, physiology M D also awarded in this field Program administered by School of Medicine This Department is also approved by the American Board of Pathology for the training of hospital and university pathologists Faculty 6 full time

Pharmacology Prerequisites strong background in biological chemistry and physiology M D also awarded in this field Program administered by School of Medicine Faculty 6 full time 2 graduate students enrolled

Philosophy Logic and philosophy of science, history of philosophy, ethics, aesthetics, social philosophy, philosophy of religion, and theory of value, metaphysics and theory of knowledge Combined program with Departments of Art and Archaeology, Classics, and History Prerequisites logic, ethics history of philosophy, and enough other work to afford fundamental preparation in the field, broad background in the liberal arts and sciences Faculty 7 full time. 11 graduate students enrolled

Physics Nuclear physics, cosmic rays and high energy particles, nuclear and electronic magnetic resonance, physical electronics, Beta and Gamma spectroscopy, theoretical physics Prerequisites 4 years of undergraduate work in physics and in mathematics, 2 to 3 years in chemistry, 2 to 3 years of undergraduate work

in one of two foreign languages Recommended reading knowledge of French and German Faculty 22 full time 50 graduate students enrolled

Physiology Electrical manifestations of nerve and muscle, physical properties of muscle, respiration, kidney Prerequisites adequate training in physics, general and organic chemistry, and general biology, work in physical chemistry and biological chemistry M D also awarded in this field Program administered by School of Medicine Faculty 7 full time 1 graduate student enrolled

Political Science All major branches Prerequisites strong background in political science and the social sciences Faculty 7 full time 19 graduate students enrolled

Psychology General experimental (including physiological and comparative) and clinical psychology Prerequisite strong background in psychology Faculty 10 full time, 10 part time 53 graduate students enrolled

Romance Languages Prerequisites a good command of one of the principal Romance languages, plus some knowledge of a second, Latin and German Faculty 7 full time 12 graduate students enrolled

Sociology/Anthropology Community organization, urban sociology, ecology and demography, culture and personality, cultural change and economic development, general theory comparative institutions with special reference to the Far East, Africa, Latin America, and the United States, research methods industrial sociology and administrative behavior Prerequisites undergraduate major in sociology anthropology or the equivalent Faculty 10 full time 33 graduate students enrolled

Speech and Hearing Anatomy and physiology of speech and hearing, pathology of speech and hearing, tests and measurements of the deaf psychoacoustics, electroacoustics applied audiology training of the deaf or speech defectives Prerequisites undergraduate major in speech and hearing, adequate preparation in anatomy or physiology, psychology, and education Faculty 10 full time 12 graduate students enrolled

Zoology Prerequisites 18 hours of zoology, a year of college physics or organic chemistry Recommended Graduate students are advised to spend at least one summer at a seashore laboratory in the study of marine life Faculty 9 full time 16 graduate students enrolled

NOTES

Various departments have programs designed to increase the effectiveness of the doctoral candidate as a college teacher. Some are informal. In other cases they are special courses e.g. Methods of Teaching Biology.

Wayne State University

DETROIT, MICHIGAN

The Graduate School

The Graduate School was formally organized in 1932 and the Ph.D. program authorized in 1943. General administration is in the hands of the Graduate Dean. Policy is established by a Graduate Council of twenty-five members elected from the several colleges of the University by the full-time graduate faculty of those colleges.

Men and women. Summer and evening courses. 37 Ph.D.s awarded in 1956-7.

Residence requirement for the doctorate: full-time enrollment during at least two successive semesters or three terms. To be classified as full-time, the applicant must earn at least 10 hours of course credit during a semester; seven during a term, or be certified by his adviser as having followed a full-time program of study on the campus during the prescribed period of residence.

ADMISSION REQUIREMENTS

Equivalent of a bachelor's degree, preparation and ability to pursue graduate study in the major field. Doctoral applicant ordinarily must have an honor point average of at least 3.0 (B or better). Non-residents of Michigan may be accepted only if such an admission does not prevent acceptance of a qualified Michigan resident and if it is not in a probationary classification.

GRE in some departments.

Apply at least 30 days before the beginning of each registration period to Office of the Dean of the Graduate School.

FEES AND FIRST YEAR AID

Tuition—\$180 maximum for students in residence; \$10 per credit hour additional (not to exceed \$100) for non-resident students. Room—\$101 to \$231 for 20-week period. Cafeteria.

A number of tuition scholarships are available

through the Office of the Graduate Dean. Fellowships and assistantships are administered by the several departments which offer doctoral degrees. Apply at least six months prior to the date of first enrollment.

FIELDS OF STUDY FOR THE PH.D.

Anatomy Faculty 9 full-time, 3 graduate students enrolled.

Chemistry Analytical, organic, inorganic and physical chemistry, biochemistry. A combined program is offered in physiological chemistry with the Department of Physiology of the College of Medicine. Prerequisites: undergraduate major in chemistry. Faculty 18 full-time, 5 part-time, 106 graduate students enrolled.

Educational Psychology Prerequisites: teaching experience, undergraduate major in psychology. Faculty 10 full-time, 28 part-time, 45 graduate students enrolled.

English American literature, literary criticism, linguistic studies in Middle and Modern English. Combined program with Teaching College. Subjects offered. Prerequisites: comprehensive examination covering the entire area of the undergraduate program. Faculty 22 full-time, 5 part-time, 75 graduate students enrolled.

History American, European. Prerequisites: undergraduate major in history. Faculty 19 full-time, 3 part-time, 31 graduate students enrolled.

Mathematics Pure mathematics, applied mathematics, mathematical statistics. Prerequisites: undergraduate major in mathematics. Faculty 25 full-time, 3 part-time, 40 graduate students enrolled.

Medical Microbiology Combined program of Biology Department of the College of Liberal Arts and the Department of Microbiology of the College of Medicine. Prerequisites: undergraduate major in the field. Faculty 4 full-time, 2 part-time, 5 graduate students enrolled.

Modern Languages French, German, Spanish. This is a joint program offered by the three departments. Prerequisites: GRE, undergraduate major in one language, at least 20 hours in either of the other two. Faculty 20 full-time, 1 part-time, 8 graduate students enrolled.

Physics Theoretical, solid state, and nuclear physics. Prerequisites: undergraduate major, including one course in astronomy or geology and chemistry through one course in qualitative analysis. Faculty 15 full-time, 2 part-time.

Physiological Chemistry Prerequisite under graduate major in chemistry Combined program with chemistry Program administered by School of Medicine Faculty 6 full time, 6 part time 14 graduate students enrolled

Physiology Pharmacology Prerequisites general, analytical, and organic chemistry, college physics Program administered by the Department of Physiology and Pharmacology of the School of Medicine Faculty 2 full time, 2 part time 7 graduate students enrolled

Psychology General theoretical, clinical, industrial, social Prerequisites MA or one year of graduate work in psychology, GPA of 3.0 Faculty 11 full time, 5 part time 43 graduate students enrolled

Sociology Social disorganization, social psychology, urban psychology Prerequisites 1 course each in anthropology, statistics, social psychology, methods, theory, advanced general sociology, MA, or equivalent, in sociology Faculty 17 full time, 13 part time 40 graduate students enrolled

Speech Public speaking speech science or correction Prerequisites GRE, performance test in speaking and reading, undergraduate or graduate major in speech Faculty 10 full time, 14 part time 73 graduate students enrolled

Teaching College Subjects English Any liberal arts area offering the doctorate may offer this program Combined program with Education Department Prerequisites undergraduate major in one field Program administered by the department of concentration

Western Reserve University

CLEVELAND, OHIO

The Graduate School

Although a few advanced degrees were given earlier, The Graduate School was formally organized in 1926

Professional schools and institutes on the campus make it possible for students to enrich their studies from the offerings of the School of Social Work, the Institute of Art, the Institute of Music, the Speech and Hearing Clinic, and the Library School There is a special program leading

to the Doctor of Social Work Preclinical departments of anatomy, biochemistry, microbiology, pharmacology, and physiology in the Medical School offer programs in the Graduate School leading to the Ph D and to a combined M D and Ph D in special cases

Allied divisions School of Medicine, M.D., School of Applied Sciences, School of Dentistry, D D S

Men and women Private control Summer and evening courses 30 Ph D s awarded in 1956-7

Residence requirements for doctorate one year

ADMISSION REQUIREMENTS

Graduation from an accredited college or university with a point average of at least 2.5 (C plus) and at least 18 hours in the field in which the candidate wants to do graduate work.

Tests required by certain departments Recommended GRE

Apply to University Admissions Office before August 15, January 15, and May 15 for the terms beginning one month later

FEEES AND FIRST YEAR AID

Tuition—\$26 per credit hour plus health service fee for full time students Board available at University cafeteria

Limited number of scholarships for full time students (tuition only), assistantships in some departments (half time tuition and stipends from \$1,000 to \$2,400) Apply to University Admissions Office before Mar 1 for the following academic year

FIELDS OF STUDY FOR THE PH D

American Culture Economics, education English, art, history, philosophy, political science, and sociology Faculty 6 full time 15 graduate students enrolled

Anatomy Faculty 6 full time 3 graduate students enrolled

Art Faculty 7 full time, 2 part time 68 graduate students enrolled

Biochemistry Faculty 13 full time 16 graduate students enrolled

Biology Faculty 8 full time, 2 part time 33 graduate students enrolled

Chemistry Faculty 10 full time, 1 part time 96 graduate students enrolled

Dramatic Arts Faculty 4 full time, 2 part time 16 graduate students enrolled

Economics Faculty 4 full time, 1 part time 16 graduate students enrolled

Education Faculty 9 full time, 7 part time 176 graduate students enrolled

English Faculty 15 full time 3 part time 51 graduate students enrolled

History Faculty 6 full time 4 part time 45 graduate students enrolled

Home Economics Faculty 6 full time 22 graduate students enrolled

Library Science Faculty 7 full time 10 graduate students enrolled

Microbiology Faculty 8 full time 6 graduate students enrolled

Music Faculty 4 full time, 3 part time 25 graduate students enrolled

Pathology Faculty 4 full time 3 graduate students enrolled

Physics Faculty 6 full time 17 graduate students enrolled

Physiology Faculty 6 full time 8 graduate students enrolled

Political Science Faculty 7 full time 18 graduate students enrolled

Psychology Faculty 6 full time, 2 part time 74 graduate students enrolled

Religion Faculty 2 full time 9 graduate students enrolled

Romance Languages French and Spanish Faculty 6 full time, 1 part time 30 graduate students enrolled

Speech Public speaking, speech and hearing therapy Faculty 8 full time, 11 part time 39 graduate students enrolled

(Home Economics Education), Master of Science in engineering, Master of Arts Master of Music Master of Social Work, Master of Agriculture Master of Home Economics Doctor of Philosophy and Doctor of Education

Location in heart of mineral region allows practical application of research Intensive development of chemical industry within the State affords unusual opportunities in certain fields

Men and women State control Summer courses Evening courses 12 Ph.D.s awarded in 1956-7

Residence requirement for doctorate minimum of 36 weeks in residence in full time graduate study in this University

Allied division awards Ed.D. in education

ADMISSION REQUIREMENTS

For candidacy, a period of residence, preliminary qualifying examinations demonstrating (1) a grasp of important phases and problems in the field of study, (2) ability to employ rationally the instruments of research developed in the field, and (3) a reading knowledge of French and German

Two modern foreign languages usually French and German With the approval of the Dean of the Graduate School one other language may be substituted

FEES AND FIRST YEAR AID

Tuition—In state \$55 per semester, out of state \$220

Available to first year students are teaching and research assistantships in many fields, industrial fellowships in a few departments in science and engineering Apply between March 1 and July 1 to head of department concerned

FIELDS OF STUDY FOR THE PH.D.

Agricultural Biochemistry and Nutrition Nutrition, proteins lipids, carbohydrates, chemistry of microorganisms Prerequisites training in general, analytical, organic, physical and biological chemistry, comprehensive written and oral examinations in biochemistry and two minor fields approximately 15 semester hours required in each minor field 6 graduate students enrolled

Agronomy and Genetics Crop science, soil science and genetics Prerequisites basic courses in the physical and biological sciences in addition to basic courses in agronomy and genetics, also

West Virginia University

MORGANTOWN WEST VIRGINIA

Graduate School

The Graduate School was formally established in 1930 with roots implanted in all University undergraduate work irrespective of departments or schools. It is empowered (1) to direct research with particular reference to problems of the State, and (2) to train candidates for the degrees of Master of Science, Master of Science

students are expected to acquire training in one or more related minor fields 7 graduate students enrolled

Biology Botany and zoology Prerequisites acceptance by the departmental Committee on Admissions and Qualifications, a thorough grounding in physical and biological science Certain field courses offered in summer Only a limited number of especially qualified students whose interests can be accommodated by the personnel and facilities of the department will be accepted for work toward the Ph D 29 graduate students enrolled

Chemical Engineering Prerequisites BS in Chemical Engineering or its equivalent, mathematics through differential equations 15 graduate students enrolled

Chemistry Prerequisites fundamental training in general analytical, organic, and physical chemistry pre registration examinations, differential and integral calculus 17 graduate students enrolled

Geology Detailed studies of Mississippian, Pennsylvanian, and Permian formations, mineral products, including coal, petroleum natural gas limestone, and building stone Prerequisites one year of physics two of chemistry, mathematics through analytical geometry, supporting courses in chemistry, physics, biology, or mining engineering 18 graduate students enrolled

History Prerequisites qualifying examinations over appropriate fields of history 5 graduate students enrolled

Plant Pathology Department also covers agricultural bacteriology and entomology Prerequisites not less than 32 hours in biology, plus a suitable background in chemistry, physics, mathematics, or botany as may be required by the field of specialization 10 graduate students enrolled

University of Wisconsin

MADISON, WISCONSIN

The Graduate School

Although graduate instruction was offered earlier, the School was not formally established until

1904 The first Ph D had been granted 12 years before The work of the Graduate School is under the general direction of the Graduate Faculty, the Dean is responsible for administration

A school of medicine offers the MD, a law school the Jur Sc D

National Agricultural Extension Center for Advanced Study, numerical analysis laboratory, Army Mathematics Center, instrumentation laboratory, electron microscopes, observatory, arboretum, Lake Laboratories, 250 apartments for married students Allied facilities include those of the Forest Products Laboratory, State Historical Society, and Legislative Reference Bureau

Men and women Summer and evening courses 365 Ph D's awarded in 1956 7

Residence requirement for doctorate minimum of six semesters of full time graduate study of which at least three must have been completed at this University, minimum of one year of continuous residence

ADMISSION REQUIREMENTS

Bachelor's degree An undergraduate major in the major field of graduate study equivalent to that of this University Overall undergraduate GPA of 2.75 or better

Reading knowledge of two languages French or German and a language in which there is substantial scholarly literature in student's major field, additional languages required by some departments

GRE recommended

Apply to the Dean of the Graduate School 150 Bascom Hall, at least six weeks prior to session student plans to attend

FEEES AND FIRST YEAR AID

Tuition—in state \$100 per semester, \$75 per 8 weeks summer session, out of state \$175 per semester, none for summer session

Scholarships, fellowships, research and teaching assistantships, stipends, respectively, at \$500-\$1,000, \$1,500-\$2,160, \$1,600 (\$1,750 on academic year basis) Research assistantships may be awarded on a calendar year basis Scholars, fellows and research assistants carry full graduate program, teaching assistants required to reduce program if teaching is above one quarter time Apply before February 15 to Chairman of major department.

FIELDS OF STUDY FOR THE PH D

Agricultural Economics General agricultural economics, farm management, land economics marketing, prices and agricultural data Programs depend upon offering in economics, examinations are given jointly by the two departments Prerequisites 24 credits in economics including equivalent of economics 1a and agricultural economics 4 Program administered by Economics Department Faculty 20 full time, 2 part time 46 graduate students enrolled

Agronomy Vegetable control, crop physiology, crop ecology, biometry Combined program with botany, genetics, biochemistry, plant pathology, soils Prerequisites 12 credits in agronomy and plant breeding plus additional courses appropriate to student's program Faculty 16 full time 31 graduate students enrolled

Anatomy Human and comparative morphology, embryology, neuroanatomy, medical genetics Combined program with physical education Prerequisites undergraduate preparation in zoology, chemistry, and physics Faculty 7 full time 9 graduate students enrolled

Animal Husbandry (Degrees are given only as joint degrees with other departments) Animal nutrition, animal genetics, animal physiology Combined program with biochemistry, zoology, genetics, physiology bacteriology Prerequisites undergraduate preparation in zoology, physiology and other appropriate courses Faculty 5 full time. 16 graduate students enrolled

Art and Art Education (Degree is given only as a joint degree with education) Prerequisites preparation in art, art education, and education, portfolio of art work to be examined Faculty 16 full time 33 graduate students enrolled

Art History Ancient, medieval, Far East, Renaissance Prerequisites 26 credits in art history, working knowledge of at least one foreign language Faculty 3 full time 6 graduate students enrolled

Astronomy Photometry and spectrophotometry of stars, galactic structure interstellar matter, eclipsing of binaries radiation from stars Program involves graduate work in physics and mathematics Prerequisites 2 years of college physics and mathematics through calculus Faculty 3 full time. 2 graduate students enrolled

Bacteriology Microbiology of animal diseases, dairy products, foods, industrial fermentations, soil, water or sewage, determinative bacteriology,

physiology of microorganisms, viruses and bacteriophages, molds and yeasts Combined program with soils, dairy and food industries, genetics veterinary sciences, plant pathology, medical microbiology, botany, zoology Prerequisites appropriate courses in biology and chemistry Faculty 11 full time, 2 part time 63 graduate students enrolled

Biochemistry Studies on different classes of compounds (carbohydrates, proteins etc.), various forms of living organisms (animal plant microorganisms), or organic and physical methods applied to natural products Combined program with bacteriology genetics, physical chemistry, dairy husbandry, poultry husbandry animal husbandry, agronomy Prerequisites adequate preparation in chemistry and biology Faculty 15 full time, 1 part time 107 graduate students enrolled

Biophysics New degree to be offered by a committee of biologists and physicists

Botany Anatomy and morphology of plants, algology, bryology, cytology and cytogenetics, ecology, lichenology, mycology, physiology, plant geography, taxonomy Combined program with agronomy, bacteriology biochemistry, chemistry, entomology, forestry and wildlife management, genetics, geology horticulture, physics, plant pathology, soils zoology Prerequisites 21 credits in botany, a course in zoology and in chemistry Faculty 18 full time, 2 part time 43 graduate students enrolled

Chemical Engineering Unit operations, reaction rates, applied thermodynamics process control, electrochemistry, biochemical operations, analog computing, plastics Combined program with chemistry and biochemistry Prerequisites BSc in chemical engineering Faculty 9 full time 48 graduate students enrolled

Chemistry General, inorganic, analytical, organic, and physical chemistry Prerequisites a year's course in each of these fields—general, analytical, organic and physical chemistry, 1 year of physics, mathematics through calculus Recommended GRE Faculty 27 full time 178 graduate students enrolled

Civil Engineering Highway, hydraulics, municipal sanitary, structural engineering or surveying BSc in civil engineering required Faculty 13 full time 71 graduate students enrolled

Classical Greek, Latin Prerequisites 24 credits of Greek beyond elementary Greek, 24 credits

of Latin beyond elementary Latin. Faculty 4 full time, 1 part time 6 graduate students enrolled

Commerce Accounting, finance, industrial management, labor, marketing, public utilities and transportation, real estate, risk and insurance, statistics Combined program with economics Prerequisites preparation equivalent to the BBA Faculty 32 full time, 8 part time 108 graduate students enrolled

Comparative Literature Prerequisites under graduate major in comparative literature, reading knowledge of several foreign languages Faculty 3 full time, 2 part time 2 graduate students enrolled

Dairy and Food Industries Dairy industry food industry Prerequisites undergraduate major and preparation in chemistry and biology Faculty 10 full time, 1 part time 33 graduate students enrolled

Dairy Husbandry Dairy cattle nutrition physiology, breeding management Combined program with biochemistry and genetics Prerequisites undergraduate major and preparation in biology Faculty 6 full time 13 graduate students enrolled

Economics Economic theory, agricultural economics economic history and institutions, finance, international economics, labor public utilities, statistics Combined program with agricultural economics and commerce Prerequisites 30 undergraduate credits in economics Faculty 16 full time, 1 part time 89 graduate students enrolled

Education Educational foundations curricula administration and supervision counseling and guidance, elementary education, secondary education, and audio visual instruction Combined program possible with all subject matter fields at secondary school level and with music physical education, political science, psychology, sociology Prerequisites equivalent of University Teacher's Certificate Students must be admitted by the department to graduate work beyond the master's degree Faculty 41 full time, 5 part time 169 graduate students enrolled

Electrical Engineering Photometry, servomechanisms, circuit analysis, computer systems, power system analysis, gaseous and solid electronics, ultra high frequencies and microwaves, special instrumentation and others BSc in electrical engineering required Faculty 17 full time 119 graduate students enrolled

English Prerequisites 24 credits beyond re

quired freshman and sophomore English, including a two semester course in Shakespeare, a course in Chaucer or Milton (or one of these and a period of English before 1900), and 19th century American or English literature, one semester of old English, GRE Faculty 19 full time, 2 part time 169 graduate students enrolled

Entomology Insecticides, toxicology, taxonomy, physiology, nutrition, ecology, disease transmission, biological control, insect plant relations, insect resistance in plants, apiculture Combined program with genetics, plant pathology, zoology Prerequisites equivalent of undergraduate major in entomology at this University Faculty 14 full time 40 graduate students enrolled

Forestry and Wildlife Management (Joint degrees with botany, zoology, or other biological science department) Prerequisites bachelor's degree, with a major in an appropriate biological science Faculty 6 full time 10 graduate students enrolled

French and Italian Prerequisites undergraduate major in French or Italian Faculty 12 full time 34 graduate students enrolled

Genetics Animal, bacterial, and plant genetics Combined program with agronomy animal husbandry, bacteriology, biochemistry, botany, dairy husbandry, horticulture, mathematical statistics medical microbiology, plant pathology, poultry husbandry, zoology Prerequisites undergraduate major in genetics Faculty 12 full time, 4 part time 43 graduate students enrolled

Geography Regional geography, systematic and cultural geography, historical geography, and cartography and air photo interpretation Prerequisite undergraduate major in geography Faculty 9 full time, 1 part time 36 graduate students enrolled

Geology Structural metamorphic, economic geology, stratigraphy, paleontology and petroleum geology, sedimentation, mineralogy and petrology geomorphology and glacial geology, geophysics, X ray Prerequisites undergraduate major in geology Faculty 10 full time 77 graduate students enrolled

German Literature, linguistics Prerequisites undergraduate major in German Faculty 7 full time 11 graduate students enrolled

History Ancient, medieval, Britain and the British Empire, modern European, United States, American civilization Combined program with Education Department Prerequisite undergrad

uate major in history Faculty 18 full time, 2 part time 166 graduate students enrolled

History of Science (Ph D offered only as a joint major with History or Natural Science Departments) Prerequisites undergraduate major in history of science, history, science, or classics Faculty 2 full time, 1 part time 4 graduate students enrolled

Home Economics Human nutrition, experimental foods, family economics Combined program with biochemistry, education Prerequisite undergraduate major in home economics Faculty 26 full time 2 part time 36 graduate students enrolled

Horticulture (Ph D offered only as a joint major with agronomy, bacteriology, biochemistry, botany, dairy and food industries entomology, genetics, plant pathology, or soils) Prerequisite undergraduate major in horticulture Faculty 12 full time, 18 graduate students enrolled

Journalism Ph D offered in mass communications under a committee including representatives from political science psychology, and sociology Prerequisite undergraduate major in journalism Faculty 13 full time, 2 part time 24 graduate students enrolled

Linguistics Comparative Indo European linguistics Prerequisites elementary Greek, a reading knowledge of French, German, and Latin Faculty 2 full time, 11 part time 3 graduate students enrolled

Mathematics Algebra analysis foundations geometry, topology, applied mathematics Prerequisites 15 semester hours of mathematics beyond calculus Faculty 15 full time, 2 part time 97 graduate students enrolled

Mechanical Engineering Stress analysis manufacturing methods, motion and time study, heat transmission, air conditioning and refrigeration, steam power, internal combustion engines BSc in mechanical engineering a prerequisite Faculty 17 full time 98 graduate students enrolled

Mechanics Engineering Analytical or materials BSc in engineering mechanics required for admission Faculty 6 full time, 1 part time 14 graduate students enrolled

Medical Microbiology Prerequisites undergraduate major in microbiology or bacteriology, plus chemistry through organic, a year course in physics Faculty 6 full time, 1 part time 13 graduate students enrolled

Meteorology Ph.D program arranged by a

committee to include members from Departments of Meteorology, Physics, Mathematics, Engineering Prerequisite undergraduate major in meteorology, or equivalent preparation Faculty 3 full time 8 graduate students enrolled

Mining and Metallurgical Engineering Mineral economics, mineral dressing, or many phases of metallurgy Prerequisite BSc in mining and metallurgy Faculty 6 full time 20 graduate students enrolled

Music (Ph D given only as a joint degree with other departments, primarily education.) Prerequisites courses in music history and literature music theory, and applied music Faculty 19 full time 16 graduate students enrolled

Oncology Prerequisite major in chemistry, medical science, or biology, or an M.D. Faculty 8 full time 17 graduate students enrolled

Pathology (Ph D offered only as a joint degree with bacteriology biochemistry, physiology, physiological chemistry, pharmacology, veterinary science, or zoology) Prerequisites pathology 101 and medical microbiology 102 Faculty 4 full time, 1 graduate student enrolled

Pharmacology Pharmacology, toxicology Prerequisite background courses in biology Faculty 4 full time 15 graduate students enrolled

Pharmacy History of pharmacy, pharmaceutical chemistry, pharmacy administration, pharmacognosy Administered as a joint program with commerce Prerequisite undergraduate major in pharmacy Faculty 10 full time, 2 part time 64 graduate students enrolled

Philosophy Logic, history of philosophy, ethics, aesthetics, epistemology, metaphysics Prerequisite undergraduate major in philosophy Faculty 6 full time 10 graduate students enrolled

Physical Education—Women Curriculum, dance kinesiology measurement, motor development, physiological effects of motor activities and relaxation Combined program with anatomy, education, physiology Prerequisite undergraduate major in physical education or dance Faculty 7 full time 19 graduate students enrolled

Physics Theoretical nuclear, meson, solid state, and low temperature physics, atomic and molecular spectroscopy, X rays, gaseous electronics, thermodynamics Prerequisite undergraduate major in physics Faculty 19 full time 99 graduate students enrolled

Physiological Chemistry Protein fractionation and characterization, intermediary metabolism,

enzymology Prerequisite undergraduate major in chemistry, a year course in biology Faculty 5 full time, 1 part time 4 graduate students enrolled

Physiology Prerequisite undergraduate major in biology or medical science Faculty 9 full time 10 graduate students enrolled

Plant Pathology Nematology and other main branches Prerequisite undergraduate major in plant pathology or botany Faculty 23 full time 44 graduate students enrolled

Political Science Political theory, comparative government, international law and organization, international relations, American political institutions, public administration, public law, politics, public policy Prerequisite undergraduate major in political science Faculty 12 full time, 3 part time 61 graduate students enrolled

Poultry Husbandry (Ph D offered only as a joint degree with biochemistry, genetics, or other departments) Prerequisite undergraduate major in poultry husbandry Faculty 4 full time 7 graduate students enrolled

Psychology Experimental, social, industrial animal, physiological, clinical Prerequisite undergraduate major in psychology Faculty 13 full time, 3 part time 62 graduate students enrolled

Rural Sociology (Ph D offered only as a joint degree with sociology) Prerequisite undergraduate major in sociology Faculty 6 full time, 1 part time 9 graduate students enrolled

Sanitary Chemistry Prerequisite undergraduate major in chemistry Faculty 1 full time, 4 part time 2 graduate students enrolled

Sociology and Anthropology Prerequisite undergraduate major in anthropology or sociology Faculty 15 full time, 5 part time 44 graduate students enrolled

Soils Prerequisite undergraduate major in soils Faculty 16 full time, 2 part time 43 graduate students enrolled

Spanish and Portuguese Language, literature civilization Prerequisite undergraduate major in Spanish Faculty 8 full time, 1 part time 34 graduate students enrolled

Speech Rhetoric and public address, theatre and interpretation, speech pathology and audiology speech science, radio and television, speech pedagogy Prerequisite undergraduate major in speech Faculty 12 full time, 1 part time 46 graduate students enrolled

Veterinary Science Bacteriology, parasitology, pathology, and physiology as applied to the veterinary field Prerequisite DVM, or equivalent preparation Faculty 7 full time, 1 part time 24 graduate students enrolled

Zoology Comparative anatomy, comparative histology, comparative and general physiology, cytology, endocrinology, fishery ecology, hydrobiology, animal behavior, ornithology, parasitology, protozoology, animal serology Combined program with wildlife management, genetics, anatomy entomology, veterinary science Prerequisites undergraduate major in zoology, GRE Faculty 12 full time, 3 part time 77 graduate students enrolled

NOTES

Many departments have informal programs in connection with teaching assistants, courses in teaching are offered for credit towards advanced degrees in several departments

University of Wyoming

LARAMIE, WYOMING

The Graduate School

Graduate degrees were first given in 1897, but the Graduate School was not formally organized until 1946

Summer and evening courses offered 4 Ph D s awarded in 1956 7

For the Ph D a candidate must complete at least three academic years of resident graduate work beyond the bachelor's degree At least four semesters must be spent at the University of Wyoming and at least two consecutively Ordinarily the first two years will be devoted to course work and the third to intensive research Ed D also awarded in cooperation with the Graduate Study Division of the College of Education

Herbarium for research, vertebrate and invertebrate paleontological museums, library facilities in wool technology, research facilities at Jackson Hole Station, summer camp facilities for instruction and research in geology, botany and zoology, radiological equipment, archival material in Western history

Collaboration with State Veterinary Laboratory and Game and Fish Research Laboratory.

facilities for research in cooperation with US Bureau of Mines Petroleum and Oil Shale Experiment Station, laboratory school for education students, and study skills center

ADMISSION REQUIREMENTS

Bachelor's degree and demonstrated ability to do superior academic work in major and cognate fields Reading knowledge of French and German, statistics may be substituted for one language, if recommended by advisory committee

Apply at least four weeks prior to opening of session at which attendance is desired to Section on Admissions, Office of Registrar

FEES AND FIRST YEAR AID

Tuition—\$100 per semester for in state, \$205 for out of state Room—\$75 per semester for a double room for men, \$60 \$100 for women Average board at cafeteria, \$2.25 per day

Graduate assistantships available in most areas of the University Fellowship programs in American studies and geology Apply between January and March for year ahead Assistantship blanks in Graduate School office, American studies blanks in office of Director, American Studies Program, geology blanks in office of Head of the Department of Geology

FIELDS OF STUDY FOR THE PH D

Agriculture Agronomy, including crops, soils, plant pathology, and range management, animal production agricultural economics, and wool technology Prerequisites adequate background and demonstrated proficiency Faculty 62 full time, 1 part time 41 graduate students enrolled

Chemistry Organic para Clausen rearrangement mechanism of ozonization biochemistry biosynthetic methods for aromatic compounds, cancer, analytical use of synthetic resins, physical-oxidation with periodates, inorganic complex component of metal halides with phosphorus oxychloride, reduction of metal sulfides, and silicate chemistry Prerequisites AB or BS, usual one year courses in undergraduate general, analytical, organic, and physical chemistry, calculus, also qualifying examinations in general, analytical, organic, and physical chemistry based on content of usual first courses in these fields Recommended general physics Faculty 10 full time, 6 part time 9 chemistry major graduate students, 3 others

Geology Stratigraphy, structural geology, geomorphology, vertebrate paleontology, invertebrate paleontology, and mineral deposits Prerequisites 30 semester hours in geology, 10 semester hours of chemistry, 10 of mathematics, and 8 of physics, M.A. before admission to Ph.D. program Recommended general, historical, and structural geology, mineralogy, geomorphology, invertebrate paleontology, and stratigraphy Faculty 7 full time 40 graduate students enrolled

Zoology and Physiology Parasitology, ecology, and wildlife conservation and management Prerequisites 20 semester hours in zoology Recommended GRE Faculty 7 full time, 4 part time 14 graduate students enrolled

Yale University

NEW HAVEN, CONNECTICUT

Graduate School

Established in 1847, although graduate instruction had been offered earlier First Ph.D. degree conferred in 1861 Women first admitted as candidates for doctorate in 1892 Graduate instruction in science and mathematics is given, under administration of the Graduate School, by the faculty of the Sheffield Scientific School, New Haven

Albion divisions granting the doctorates include School of Drama, D.F.A., School of Engineering, D.Eng., School of Forestry, D.For., School of Law, S.J.D. and D.C.L., School of Medicine, M.D. and D.P.H.

Hall of Graduate Studies combines residence for men with classroom and seminar facilities, residence hall for graduate women planned, professional school libraries, natural history museum, art gallery, Institute of Human Relations, Child Study Center, electron accelerator, heavy particle ion accelerator, observatory, Yale Columbia Southern Station at Mt. Stromlo, Canberra, Australia, Human Relations Area Files, affiliation with Brookhaven National Laboratory and with Bishop Museum in Honolulu

Men and women 195 Ph.D.'s awarded in 1956-7

Residence requirement for doctorate minimum of three full years following undergradu

ate study, at least one full year in residence following graduate study elsewhere before proceeding to residence for the dissertation year

ADMISSION REQUIREMENTS

Selection based on scope and sufficiency of applicant's preparation, on experience of the Graduate School with graduates of his school, on qualifications for independent scholarship, and on adaptability to the particular program

Undergraduate degree Three letters of recommendation GRE scores (November or January)

Apply to Director of Admissions, Graduate School, prior to May 15 Application forms to be procured in Fall preceding academic year in which admission is desired Application fee \$5

FEES AND FIRST YEAR AID

Tuition—\$700 per academic year Rooms—men \$100 to \$200 per term, women \$86.50 to \$150 per term Board in Graduate School dining hall and other university dining halls—approximately \$450 per academic year

Application blanks for financial aid can be obtained from the Office of the Director of Admissions, Graduate School, early in the Fall term file, completed with all credentials before February 1

FIELDS OF STUDY FOR THE PH D

African Studies An announcement that courses in several departments relating to Africa may be drawn into a program under the direction of an advisory committee

American Studies Combined study of basic elements of American history, art, literature, and social sciences for the interpretation of American civilization A third foreign language may be required in certain fields Faculty 15 full time, 1 part time 14 graduate students enrolled

Anatomy Prerequisite major in the biological sciences Faculty 8 full time 2 graduate students enrolled

Anthropology Prerequisites general acquaintance with social sciences and with psychological and social points of view Faculty 9 full time, 2 part time 18 graduate students enrolled

Astronomy Prerequisites adequate preparation in mathematics and physics Faculty 3 full time, 2 part time 3 graduate students enrolled

Biochemistry Prerequisites preparation in general, analytical, physical, and organic chem

istry, basic courses in physics and biology Faculty 15 full time, 6 part time 11 graduate students enrolled

Biophysics Prerequisites thorough preparation in physics, biology, or chemistry, or a combination of these subjects Faculty 9 full time, 3 part time 13 graduate students enrolled

Botany Prerequisites preparation in general botany, including the fundamental aspects of morphology, physiology, and taxonomy, courses in mathematics, physics, chemistry, and biology Faculty 10 full time, 3 part time 12 graduate students

Chemical Engineering Prerequisites mathematics, physics, chemistry, and the fundamentals of chemical engineering Eng D also awarded in this field by the School of Engineering Faculty 6 full time 3 graduate students enrolled

Chemistry Prerequisites fundamental courses of college grade in general, analytical, organic, and physical chemistry, physics (these being courses with laboratory), mathematics through calculus Faculty 22 full time 85 graduate students enrolled

Civil Engineering Prerequisites mathematics, including differential equations, mechanics, chemistry, physics, fundamentals of engineering, Eng D also awarded in this field by School of Engineering Faculty 7 full time

Classical Languages and Literatures Greek, Latin ancient history, classical archaeology, and historical and comparative grammar Faculty 15 full time, 1 part time 13 graduate students enrolled

Comparative Literature Students must be qualified by their knowledge of languages to explore the interrelations of several modern literatures or the classical influences in one or more modern literatures Thorough acquaintance with one literature Reading knowledge of Latin or Greek Faculty 12 full time 10 graduate students enrolled

Economics Prerequisites preferably an undergraduate major in economics but students from other fields of social science may be admitted Undergraduate preparation in economic theory, mathematics through integral calculus, statistics Recommended courses in psychology, history, and other social sciences Faculty 34 full time, 3 part time 51 graduate students enrolled

Electrical Engineering Prerequisites mathematics, physics, and the engineering sciences, in

cluding a degree from an institution that presents an electrical engineering program accredited by E.C.P.D., or its equivalent. Eng D also awarded in this field by School of Engineering Faculty 17 full time 6 graduate students enrolled

English Language and Literature An adequate background with emphasis on the humanities for advanced study in literature, ability to meet at the time of admission the requirements in French, German, and Latin Faculty 17 full time, 2 part time 100 graduate students enrolled.

Foreign Area Studies There is no doctoral program but qualified students who have completed the master's degree may proceed to the doctorate in history, international relations, economics, political science, sociology, and other departments continuing emphasis on their interest in Foreign Area Studies Faculty 19 full time 13 part time 12 graduate students enrolled

Forestry Prerequisites at least one full year of botany including general morphology, histology, taxonomy, and the physiology of plants, at least one course in zoology or general biology, physics, chemistry, geology, economics, mathematics through trigonometry D For also awarded in this field by School of Forestry Faculty 25 full time, 4 part time 12 graduate students enrolled

Geology Mineralogy and crystallography petrology, structural geology, geomorphology and Pleistocene geology, economic geology paleontology and stratigraphy, sedimentology, geochemistry Prerequisites at least one term each in physical geology, historical geology, mineralogy, petrology, paleontology, field geology, courses of at least two terms each in general physics, general chemistry, mathematics through trigonometry and analytical geometry Students specializing in paleontology or stratigraphy should have completed a course in elementary biology, those specializing in vertebrate paleontology should be prepared in comparative anatomy For any branch of inorganic geology the elements of calculus and physical chemistry are necessary Faculty 14 full time 35 graduate students enrolled.

Germanic Languages and Literatures Prerequisites reading knowledge of Latin and French, ability to read difficult German, facility in writing and speaking German, a general background in German literature and history Reading knowledge of one Scandinavian language required for

the degree Faculty 9 full time 8 graduate students enrolled

History Prerequisites basic training in history, but with attention to broad study in the humanities and social sciences Program combining ancient history with medieval or modern history under the joint direction of Department of Classics and Department of History Faculty 23 full time, 4 part time 47 graduate students enrolled

History of Art Prerequisites a general knowledge of the history of architecture, painting, and sculpture, acquaintance with the fundamental principles of art criticism Faculty 11 full time, 1 part time 18 graduate students enrolled

History of Music Prerequisites theory and history of music. Students also required to take one or two courses in history, literature, history of art, or philosophy Recommended a reading knowledge of Latin A reading knowledge of Italian may be demanded if the student's research requires it Faculty 8 full time, 1 part time 18 graduate students enrolled

History of the Theatre Prerequisites under graduate work in history, method, and practice of the theatre, with attention to broad training in history and literature D.P.A. also awarded in this field by School of Drama Faculty 10 full time 6 graduate students enrolled

Indic and Far Eastern Languages and Literatures The work of this department is basically philological with emphasis on the cultures of Oriental peoples through interpretation of their literatures The undergraduate should take advantage of such courses in Oriental culture as may be available to him and, if possible, should take basic work in one Oriental language Faculty 12 full time 3 graduate students enrolled

International Relations Prerequisites an undergraduate major in political science or history, together with two or more courses in economics However, students who have majored in the humanities or social sciences with a distinguished record may be admitted. Faculty 22 full time, 2 part time 31 graduate students enrolled

Linguistics Prerequisites French and German, with ability to use both languages as tools for study and research, Latin and Greek with ability to read simple prose and recognize grammatical forms Faculty 22 full time, 9 graduate students enrolled

Mathematics Prerequisite thorough basic preparation in mathematics Faculty 13 full

time, 1 part time 28 graduate students enrolled

Mechanical Engineering Prerequisites acceptable undergraduate training in the fundamental subjects of mechanical engineering, mathematics and physics Eng D also awarded in this field by School of Engineering Faculty 9 full time 1 graduate student enrolled

Medieval Studies Not a separate program but an announcement calling attention to the offerings in Arabic civilization, English literature, Far Eastern civilization Germanic and Celtic literatures, history, history of art history of music, history of the theatre, Latin literature and paleography, philosophy, religion, Romance literatures, and Slavic languages Students enroll in the appropriate department but their program will be jointly directed by the Advisory Committee on Medieval Studies

Metallurgy Prerequisites acceptable undergraduate preparation in mathematics physics, physical chemistry and the fundamental engineering treatment of materials of construction Eng D also awarded in this field by School of Engineering Faculty 4 full time 2 graduate students enrolled

Microbiology Prerequisites evidence of preparation in biology, mathematics, physics, and chemistry, including at least one year of organic chemistry Faculty 11 full time, 4 part time 17 graduate students enrolled

Near Eastern Languages and Literatures Because collegiate work rarely includes courses in Near Eastern Languages students in this department must ordinarily expect to devote a longer period of time to the attainment of the degree, unless advanced competence in at least one Near Eastern language is demonstrated upon admission Faculty 9 full time 4 graduate students enrolled

Pharmacology Disciplines of biochemistry and physiology Adequate comprehension of physiology, organic chemistry, and microbiology is necessary Faculty 9 full time, 4 part time 2 graduate students enrolled

Philosophy History of philosophy, ethics, aesthetics, and the theory of value, metaphysics and the theory of knowledge Recommended preliminary work should include fundamental preparation in some of the above fields and a broad program in the liberal arts and sciences A graduate student must qualify in examinations in logic and the philosophy of science Faculty 20

full time, 1 part time 65 graduate students enrolled

Physics Prerequisites an undergraduate major in physics, the elements of chemistry, mathematics through calculus and differential equations Faculty 32 full time 77 graduate students enrolled

Physiology Prerequisites biology and physics, general, analytical, physical and organic chemistry Recommended knowledge of comparative anatomy and histology Students intending to specialize in psychobiology should have general psychology Faculty 9 full time, 4 part time 2 graduate students enrolled

Political Science Political theory, comparative government politics and policy formation, public administration, international politics and organization Recommended preliminary preparation through an undergraduate major in political science or in the social sciences Faculty 17 full time, 2 part time 35 graduate students enrolled

Psychology Prerequisites theoretical and experimental psychology, experimental training in physical science and biology, social science, mathematics through calculus, statistics, philosophy history of science Faculty 27 full time, 3 part time 40 graduate students enrolled

Public Health Prerequisites basic knowledge of biological sciences and social sciences Doctor of Public Health degree is administered by the School of Medicine Faculty 27 full time, 37 part time 7 graduate students enrolled

Religion Prerequisites general orientation in historical and contemporary religion including courses in comparative religion, theology, and the philosophy of religion Languages essential to the area of specialization Students in contemporary religion must have competence in psychology, logic ethics, and the history of philosophy Faculty 25 full time 88 graduate students enrolled

Romance Languages and Literatures Prerequisites a good command of one of the principal Romance languages, a reasonable grounding in at least one other, a reading knowledge of Latin Faculty 20 full time 56 graduate students enrolled

Social Sciences Interdisciplinary work in the social sciences may be arranged by a student enrolled for a degree in one of the regular departments An advisory committee jointly supervises the program

Sociology. Prerequisites. a general foundation in the social sciences. A broad comparative knowledge of human society and culture in dynamic, as well as structural, aspects. Faculty 13 full time. 24 graduate students enrolled.

Statistics. Prerequisites. training of an advanced undergraduate character in the substantive material of the candidate's field, knowledge of the elements of chemistry, physics, and math-

ematics. Faculty 13 full time, 2 part time. 1 graduate student enrolled.

Zoology. Prerequisites. the elements of botany, chemistry, mathematics (including elementary calculus), and physics, basic courses in zoology, including vertebrate and invertebrate zoology with histology and embryology, general physiology, and genetics. Faculty 17 full time, 8 part time. 22 graduate students enrolled.

GUIDE TO FIELDS OF STUDY for the Ph.D.

Note Where 50 or more institutions offer Ph D programs in the same field of study, no specific listing of schools is provided in this Guide to Fields of Study. Accordingly the following fields are included in the Guide but without institutional designations: chemistry (106 schools), economics (61), English (72), education (56), chemical engineering (51), history (74), mathematics (75), philosophy (50), physics (83), and psychology (82)

Accountancy U of Ill

Accounting State U of Iowa La State U, N Y U, Ohio State U

Accounting and Statistics U of Mo

Aeronautical Engineering Poly Inst of Brooklyn U of Colo, Cornell U, U of Ill, U of Mich, U of Minn, Ohio State U, Pa State U, Rensselaer Poly Inst Stanford U, U of Tex

Aesthetics of Literature Johns Hopkins U

African Studies Yale U

Agricultural and Biological Chemistry Pa State U

Agricultural Biochemistry U of Minn, Ohio State U, Rutgers U

Agricultural Biochemistry and Nutrition W Va U

Agricultural Botany U of Minn (see Applied Plant Physiology)

Agricultural Chemistry U of Ariz, U of Calif, U of Mo

Agricultural Chemistry and Biochemistry La State U

Agricultural Economics U of Calif, U of Conn, Cornell U U of Fla U of Ill, Kans

State Col, U of Ky, La State U, U of Md Mich State U, U of Minn, U of Mo, U of Nebr, N C State Col, Oreg State Col Pa State U, State Col of Wash U of Wis

Agricultural Economics and Rural Sociology Ohio State U

Agricultural Economics and Sociology A & M Col of Tex

Agricultural Education Ohio State U Okla State U, Pa State U

Agricultural Engineering Cornell U, Iowa State Col, Mich State U U of Mo

Agricultural Microbiology Rutgers U

Agricultural Sciences Miss State Col

Agriculture U of Wyo

Agronomy U of Ariz Cornell U, U of Fla, U of Ill, Iowa State Col Kans State Col La State U, U of Md U of Mass U of Minn U of Nebr, Ohio State U Okla State U, Pa State U Purdue U A & M Col of Tex, Utah State U, State Col of Wash, U of Wis

Agronomy and Genetics W Va U

Altaic Languages Columbia U (see Uralic)

American Civilization Brown U, U of Md, N Y U U of Pa

American Culture Western Reserve U

American History U of Md

American Literature Claremont Col, Johns Hopkins U (see History and American Literature)

American Studies U of Minn, U of N Mex, U of Notre Dame

Analysis of Ideas and Study of Methods U of Chicago

Analytical Chemistry U of Minn

Anatomy U of Ala, Baylor U, Boston U, U of Buffalo, U of Calif, U of Chicago, U of Cincinnati, U of Colo, Columbia U, Duke U, George Washington U, Ind U, U of Kans, La State U, Loyola U, U of Md, Mich State U, U of Mich, U of Minn, U of Mo, U of Nebr, N Y U, State U of N Y, U of N Dak, Northwestern U, Ohio State U, U of Pa, U of Rochester, St Louis U, U of Southern Calif, Stanford U, Temple U, Tulane U, U of Utah, Vanderbilt U, U of Va, Wash U, U of Wash, Wayne State U, Western Reserve U, U of Wis, Yale U

Animal Breeding Kans State Col

Animal Breeding and Physiology Cornell U

Animal Genetics U of Nebr

Animal Husbandry Cornell U, U of Fla, Iowa State Col, Mich State U, U of Minn, Okla State U, Oreg State Col, Pa State U, Purdue U, A & M Col of Tex, Utah State U, U of Wis

Animal Husbandry and Nutrition Ala Poly Inst

Animal Industries U of Conn.

Animal Industry U of Ky, N C State Col

Animal Nutrition Cornell U, U of Ill (see Animal Science), Kans State Col, Pa. State U

Animal Pathology Colo State U, U of Conn.

Animal Physiology Cornell U (see Animal Breeding)

Animal Science Ohio State U, State Col of Wash.

Animal Sciences Miss State Col.

Animal Science and Animal Nutrition U of Ill.

Anthropology American U (see Sociology), U of Ariz, Bryn Mawr Col, U of Calif, Catholic U, U of Chicago, U of Colo, Columbia U, Cornell U (see Sociology), Harvard U, Ind U, State U of Iowa (see Sociology), Johns Hopkins U, La State U (see Geography), Mich State U (see Sociology), U of Mich, U of Minn, U of Mo (see Sociology), U of N Mex, U of N C (see Sociology), Northwestern U, U of Oreg, U of Pa, Stanford U, Syracuse U (see Sociology), Tulane U (see Sociology), U of Wash, U of Wis (see Sociology), Yale U,

Anthropology Sociology U of Calif

Applied Arts Ohio State U (see Fine Arts)

Applied Mathematics Brown U, U of Calif, Columbia U

Applied Mechanics Poly Inst of Brooklyn (see Aeronautical Engineering), Calif Inst Tech

(see Civil, Mechanical Engineering, and Applied Mechanics), U of Ill (see Theoretical and Applied Mechanics), Iowa State Col (see Theoretical and Applied Mechanics), Kans State Col, Mich State U, Va Poly Inst

Applied Physics Harvard U (see Engineering)

Applied Plant Physiology and Agricultural Botany U of Minn

Applied Science U of Cincinnati

Archaeology Columbia U (see Fine Arts), U of Pa, Princeton U (see Art), Wash U (see Art)

Architecture Harvard U, Ill Inst Tech, Princeton U, Stanford U (see Art)

Architecture and Planning and Housing Columbia U

Area Studies Johns Hopkins U

Art U of Chicago, State U of Iowa, U of Minn, Northwestern U, Western Reserve U

Art and Archaeology Princeton U, Wash U

Art and Architecture Stanford U

Art and Art Education U of Wis

Art Education Pa State U, U of Wis (see Art)

Art History U of Calif, U of Wis

Astro Geophysics U of Colo

Astronomy U of Calif, Calif Inst Tech, Case Inst Tech, Columbia U, Cornell U, Georgetown U, Harvard U, Ind U, State U of Iowa (see Mathematics), U of Mich, Northwestern U, Ohio State U (see Physics), U of Pa, U of Pittsburgh, Princeton U, U of Rochester (see Physics), Vanderbilt U (see Physics), U of Va, U of Wis, Yale U

Astronomy and Astrophysics U of Chicago

Astrophysics U of Chicago (see Astronomy)

Audiology Northwestern U (see Speech Correction), Stanford U (see Speech Pathology), Wash U

Audiology and Speech Pathology Syracuse U

Bacteriology U of Calif, U of Cincinnati, Colo State U, U of Conn, Cornell U, U of Fla, George Washington U, U of Ill, Ind U, Iowa State Col, State U of Iowa, Kans State Col, U of Kans, U of Ky, La State U (see Botany), U of Mass, U of Mich, U of Nebr, Northwestern U, Ohio State U, Oreg State Col, Pa State U, U of Rochester, Rutgers U, U of Southern Calif, U of Tenn, U of Tex, U of Utah, State Col of Wash, Wash U, U of Wis

Bacteriology and Botany Syracuse U

- Bacteriology and Immunology* U of Minn, U of N C
- Baltic Studies* U of Pa (see Slavic Studies)
- Banking* N Y U (see Money)
- Basic Health Sciences* Emory U
- Bible* Hebrew U Col
- Biochemistry* U of Ala, U of Ariz, U of Ark, Baylor U, Boston U, U of Buffalo, U of Calif, U of Chicago, Colo State U, U of Colo, Columbia U, Cornell U, Duke U, George Washington U, Harvard U, Johns Hopkins U, U of Kans, La State U (see Agricultural Chemistry), Loyola U, U of Minn, U of Mo, State U of N Y, U of N Dak, Northwestern U, U of Okla, U of Pa, U of Pittsburgh, Purdue U, U of Rochester, Rutgers U (see Physiology), St Louis U, Tufts U, U of Utah, Vanderbilt U, U of Va, U of Wash, U of Wis, Western Reserve U, Yale U
- Biochemistry and Nutrition* U of N C, U of Southern Calif, A & M Col of Tex, Utah State U
- Bioclimatology* Johns Hopkins U
- Biological Chemistry* U of Calif, U of Md, U of Mich, Pa State U (see Agricultural Chemistry), Wash U
- Biological Sciences* U of Cincinnati, U of Del, Miss State Col, State U of N Y, Northwestern U, U of Pittsburgh, Purdue U, Stanford U
- Biology* U of Ala, Boston U, Brown U, Bryn Mawr Col, U of Buffalo, Calif Inst Tech, Catholic U, U of Colo, Emory U, Fordham U, George Washington U, Harvard U, Ill Inst Tech, Johns Hopkins U, Lehigh U, Mass Inst Tech, U of N Mex, N Y U, U of N Dak, U of Notre Dame, U of Oreg, Princeton U, Rice Inst, U of Rochester, St Bonaventure U, St John's U, St Louis U, U of S C, U of Southern Calif, A & M Col of Tex, Vanderbilt U, U of Va, Va Poly Inst, W Va U, Western Reserve U
- Biology (Zoology)* U of Fla
- Biophysics* U of Buffalo, U of Calif, U of Chicago, U of Colo, Columbia U, U of Ill, Johns Hopkins U, U of Mich, U of Minn, U of Pa, U of Pittsburgh, Purdue U, U of Rochester, U of Wash (see Physiology), U of Wis, Yale U
- Biopsychology* U of Chicago
- Biostatistics* U of Calif, U of Minn
- Botanical Science* U of Calif
- Botany* U of Ariz, U of Calif, U of Chicago, U of Cincinnati, Claremont Col, Columbia U, U of Conn, Cornell U, Duke U, Fla State U, George Washington U, U of Hawaii, U of Ill, Ind U, Iowa State Col, State U of Iowa, Kans State Col, U of Kans, U of Md, U of Mass, U of Mich, U of Minn, U of Mo, U of Nebr, N C State Col, U of N C, Okla State U, Oreg State Col, Pa State U, U of Pa, Purdue U, Rutgers U, Smith Col, Syracuse U (see Bacteriology), U of Tenn, U of Tex, U of Utah, State Col of Wash, U of Wash, Wash U, U of Wis, Yale U
- Botany and Plant Pathology* Ala Poly Inst, Mich State U, Ohio State U, Utah State U
- Botany, Bacteriology, and Plant Pathology* La State U
- Business* Columbia U, U of Ill, State U of Iowa (see General Business), U of Mo (see Economics), Northwestern U, Stanford U
- Business Administration* U of Ala (see Commerce), American U, U of Buffalo, U of Calif, La State U, U of Mich, Mich State U, U of Minn, U of N C (see Economics), Pa State U, U of Tex, Vanderbilt U (see Economics), U of Wash
- Business and Economics* Ill Inst Tech
- Business and Industrial Management* Johns Hopkins U
- Business and Public Administration* Cornell U
- Business Education* State U of Iowa (see Office Management), Pa State U
- Business Organization* Ohio State U
- Business Organization and Management* U of Nebr
- Cancer Biology* U of Minn
- Cancer Research* U of Fla
- Celtic* Catholic U (see German, Composition Philology, and Celtic)
- Celtic Languages and Literature* Harvard U
- Ceramic Engineering* U of Ill, Iowa State Col, U of Mo, Ohio State U
- Ceramics* Rutgers U, U of Utah
- Ceramic Technology* Pa State U
- Chemical Engineering* (See Note on page 323)
- Chemical and Metallurgical Engineering* U of Mich
- Chemical Physics* Harvard U
- Chemistry* (See Note on page 323)
- Chemistry and Chemical Engineering* Calif Inst Tech
- Child Development* U of Calif

Child Development and Family Relationships.

Cornell U, Pa State U

Child Development and Nursery Education Tex Woman's U

Child Welfare State U of Iowa, U of Minn

Chinese and Japanese Columbia U

Church History Boston U

City and Regional Planning Cornell U

City Planning Ill Inst Tech

City Planning and Regional Science U of Pa

Civil and Irrigation Engineering Utah State U

Civil Engineering U of Calif, Carnegie Inst Tech,

Case Inst Tech, Colo State U, U of Colo,

Cornell U, U of Fla, Ga Inst Tech, Ill Inst

Tech, U of Ill, Iowa State Col, State U of

Iowa, Lehigh U, Mich State U, U of Mich,

U of Minn, U of Mo, Northwestern U, Ohio

State U, Oreg State Col, Pa State U, U of

Pa, Princeton U, Purdue U, Stanford U, A &

M Col of Tex, U of Tex, U of Utah, U of

Wash, U of Wis, Yale U

Civil Engineering and Engineering Mechanics Columbia U

Civil, Mechanical Engineering, and Applied Mechanics Calif Inst Tech

Classical Archaeology Bryn Mawr Col, U of Calif, U of Pa

Classical Languages U of N Mex (see Modern Languages), Ohio State U, St Louis U U of Tex

Classical Languages and Literatures U of Chicago, Yale U

Classical Studies U of Mich, U of Pa

Classics Brown U, U of Calif (see Archaeology),

U of Cincinnati, Cornell U, Fordham U, Har-

vard U, U of Ill, Ind U Johns Hopkins U, U

of Minn, N Y U, U of N C, Northwestern

U, U of Pittsburgh, Princeton U, U of Va,

Wash U, U of Wis

Climatology U of Ariz, U of Wash (see Meteorology)

Clinical Pathology U of Colo

Clinical Speech Pa State U

Clothing and Costume Design Tex Woman's U

Clothing and Textiles Pa State U

Commerce U of Wis

Communications U of Southern Calif

Communications and Journalism Stanford U

Comparative Biochemistry U of Calif

Comparative Linguistics U of N C

Comparative Literature Columbia U (see English), Harvard U, Ind U, Johns Hopkins U,

U of Mich, U of N C, Occidental Col, Pa State U, U of Southern Calif, U of Wis, Yale U

Comparative Pathology U of Calif

Comparative Pharmacology and Toxicology U of Calif

Comparative Philology Catholic U (see German, Composition, Philology, and Celtic)

Comparative Physiology U of Calif

Comparative Studies in Literature U of Chicago

Conservation Cornell U, U of Mich

Corporation Finance and Investments N Y U

Counseling and Guidance U of Ky

Criminology Tufts U

Crystallography Johns Hopkins U

Cytology George Washington U

Dairy La State U, U of Md, Mich State U, Purdue U, Rutgers U

Dairy and Food Industries U of Wis

Dairy and Food Technology Iowa State Col

Dairy Husbandry U of Minn, U of Mo, U of Wis

Dairying Oreg State Col

Dairy Science Cornell U, U of Ill Ohio State U,

Pa State U A & M Col of Tex

Dairy Technology U of Ill (see Food Technology), Ohio State U

Dance and Related Arts Tex Woman's U

Dentistry Northwestern U, U of Pittsburgh

Dermatology and Syphilology U of Minn

Diplomacy and International Relations Johns Hopkins U

Domestic Markets N Y U

Drama Cornell U (see Speech), Stanford U (see Speech)

Dramatic Art State U of Iowa (see Speech), U of Mo (see Speech)

Dramatic Arts Western Reserve U

Early Christian Literature U of Chicago (see New Testament).

East Asiatic Studies U of Calif

East European Studies Ind U

Economic and Financial History N Y U

Economic History U of Ala, U of Pa

Economic Theory and History of Economic Thought N Y U

Economic Zoology U of Minn

Economics (See Note on page 323)

Economics and Business U of Mo

Economics and Business Administration U of Fla, U of N C.

- Economics and Sociology* Princeton U
Economics Business Administration Vanderbilt U
Economics of Social Science Mass Inst Tech
Economics of the Household and Household Management Cornell U
Ecumenics Boston U
Education (See Note on page 323)
Education and Rural Education Cornell U
Educational Administration U of Minn, U of Utah
Educational Psychology U of Minn U of Utah, Wayne State U
Educational Psychology and Measurements U of Nebr
Egyptology Brown U
Electrical Engineering U of Ariz, Poly Inst of Brooklyn, Calif Inst Tech U of Calif, Carnegie Inst Tech, Case Inst Tech U of Colo, Columbia U, U of Conn Cornell U, U of Fla, Ga Inst Tech, Ill Inst Tech, U of Ill, Iowa State Col, State U of Iowa, U of Kans, Lehigh U, U of Md Mass Inst Tech Mich State U, U of Mich, U of Minn N C State Col Northwestern U Ohio State U, Oreg State Col, Pa State U, U of Pa, U of Pittsburgh Princeton U, Purdue U, Rensselaer Poly Inst Rutgers U, U of Southern Calif Stanford U, Syracuse U, A & M Col of Tex, U of Tex U of Utah, U of Wash, Wash U, U of Wis, Yale U
Elementary Education U of Utah
Endocrinology U of Calif
Engineering Brown U, U of Calif Okla State U, U of Southern Calif
Engineering Administration Case Inst Tech
Engineering and Applied Physics Harvard U
Engineering and Physical Sciences Miss State Col
Engineering Materials Cornell U (see Engineering Mechanics and Engineering Materials)
Engineering Mechanics Case Inst Tech, Columbia U (see Civil Engineering), U of Mich, U of Notre Dame, Ohio State U, Pa State U U of Pa, Stanford U, U of Tex.
Engineering Mechanics and Engineering Materials Cornell U
Engineering Physics Cornell U
Engineering Science U of Calif
Engineering Sciences Purdue U
English (See Note on page 323)
English and Comparative Literature Columbia U
English Language and Literature U of Chicago, Cornell U, U of Kans, U of Mich, Yale U
Entomology Ala Poly Inst U of Ariz, U of Calif, U of Conn, U of Hawaii, U of Ill, Iowa State Col (see Zoology), Kans State Col, U of Kans, U of Md, U of Mass, Mich State U, U of Minn, U of Mo, U of Nebr, N C State Col, Ohio State U (see Zoology), Okla State U, Oreg State Col, Purdue U, Rutgers U, U of Tenn, A & M Col of Tex, State Col of Wash U of Wis
Entomology and Limnology Cornell U
Environmental Health U of Mich
Epidemiologic Science U of Mich
Epidemiology U of Calif
European History U of Md
Experimental Biology U of Utah
Experimental Statistics N C State Col
Family Economics Pa State U (see Home Management)
Family Life and Home Administration Oreg State Col
Family Relationships Cornell U (see Child Development), Pa State U (see Child Development)
Far Eastern and Slavic Languages and Literature U of Wash
Far Eastern Languages Harvard U
Far Eastern Languages and Literatures U of Mich, Yale U (see Indic)
Far Eastern Studies Cornell U
Farm Crops Mich State U, Oreg State Col Rutgers U
Field Crops U of Mo, N C State Col
Financial History N Y U (see Economic History)
Fine and Applied Arts Ohio State U
Fine Arts Boston U, Harvard U, U of Mich, N Y U, U of Pa, U of Pittsburgh
Fine Arts and Archaeology Columbia U
Fish and Game Management Oreg State Col
Fisheries U of Mich
Fisheries and Wildlife Mich State U
Fisheries Management Ala Poly Inst
Floriculture and Ornamental Horticulture Cornell U
Fluid Mechanics Johns Hopkins U (see Meteorology), U of Minn
Folklore Ind U
Food Stanford U

- Food and Nutrition* Cornell U
Food Chemistry and Technology Rutgers U
Food Industries U of Wis
Foods and Nutrition Iowa State Col, Kans State Col, Mich State U, Oreg State Col, Purdue U, Tex Woman's U
Food Sciences U of Mass
Food Technology Cornell U, Mass Inst Tech, U of Mass, Oreg State Col, Purdue U, State Col of Wash
Food Technology and Dairy Technology U of Ill
Foreign Area Studies Yale U
Foreign Languages La State U, U of Md
Forensic Pathology U of Md
Forest Products Mich State U
Forestry Duke U, Iowa State Col, Mich State U, U of Mich, U of Minn, N C State Col, Ohio State U (see Horticulture), A & M Col of Tex (see Range), U of Wash, Yale U
Forestry and Wildlife Management U of Wis
Franciscan Institute St Bonaventure U
French Bryn Mawr Col, U of Calif, Columbia U (see Romance Philology), U of Ill, U of Southern Calif, Tulane U
French and Italian Ind U, U of Wis
French Language and Literature U of Mo
Fruit Crops U of Fla
Fuel Technology Pa State U, U of Utah
Game Management Ala Poly Inst, Oreg State Col (see Fish Management)
Gas Technology Ill Inst Tech
General Biology Cornell U (see Biology)
General Business State U of Iowa
General Home Economics Pa State U
General Linguistics Cornell U (see Linguistics)
General Physiology U of Pa
General Science Oreg State Col
Genetics U of Calif, Colo State U, U of Conn, U of Hawaii, Iowa State Col, Kans State Col, U of Nebr (see Animal Genetics), N C State Col, Oreg State Col, Purdue U, Smith Col, A & M Col of Tex, U of Utah, State Col of Wash, W Va U (see Agronomy), U of Wis
Geochemistry Pa State U (see Geophysics)
Geography Boston U, U of Calif, U of Chicago, Clark U, Columbia U, Cornell U (see Geology), U of Fla, George Washington U, U of Ill, Ind U, State U of Iowa, Johns Hopkins U, U of Kans, U of Md, U of Mich, U of Minn, U of Nebr, U of N C (see Geology), Northwestern U, Ohio State U, Pa State U, U of Pittsburgh, U of Rochester (see Geology), Stanford U, Syracuse U, U of Tenn, U of Utah, U of Wash, U of Wis
Geography and Anthropology La State U
Geological Sciences Harvard U, Va Poly Inst
Geology U of Ariz, Boston U, Bryn Mawr Col, U of Calif, Calif Inst Tech, U of Chicago, U of Cincinnati, U of Colo, Columbia U, U of Ill, Ind U, Iowa State Col, State U of Iowa, Johns Hopkins U, U of Kans, Lehigh U, La State U, Mich State U, U of Mich, U of Minn, U of Mo, U of Nebr, N Y U, Northwestern U, Ohio State U, U of Okla, Oreg State Col, U of Oreg, Pa State U, U of Pittsburgh, Princeton U, Rensselaer Poly Inst, Rice Inst, Rutgers U, U of Southern Calif, Stanford U, Syracuse U, U of Tenn, A & M Col of Tex, U of Tex, U of Utah, State Col of Wash, U of Wash, Wash U, W Va U, U of Wis, U of Wyo, Yale U
Geology and Geography Cornell U, U of N C, U of Rochester
Geology and Geophysics Mass Inst Tech
Geophysics U of Colo (see Astro Geophysics), Mass Inst Tech (see Geology), St Louis U, Stanford U, U of Utah
Geophysics and Geochemistry Pa State U
German Bryn Mawr Col, U of Calif, U of Cincinnati, Cornell U, U of Ill, Ind U, State U of Iowa, Johns Hopkins U, U of Minn, N Y U, Northwestern U, Ohio State U, Pa State U, U of Southern Calif, Wash U, U of Wis
German and Comparative Philology and Celtic Catholic U
Germanic and Romance Languages Stanford U
Germanic Languages U of Calif, Columbia U, U of N C, U of Tex
Germanic Languages and Literature Boston U, U of Chicago, Harvard U, U of Mich, Syracuse U, Yale U
Germanics U of Pa, U of Wash
Gnostobiotics U of Notre Dame
Government Boston U, U of Buffalo, Claremont Col, Clark U, Columbia U (see Public Law), Cornell U, Fla State U, Georgetown U, Harvard U (see Political Economy), Ind U, Lehigh U (see History), N Y U, U of Okla, St Louis U, U of Tex
Government and Politics U of Md
Greek Bryn Mawr Col, U of Minn
Greek and Latin Catholic U, Columbia U

- Guidance* U of Ky (see Counseling)
- Gynecology* U of Chicago (see Obstetrics), U of Colo (see Obstetrics) U of Minn (see Obstetrics)
- Health and Physical Education* Tex Woman's U
- Health Education* Tex Woman's U U of Utah
- Health Education and Physical Education* La State U
- Health Physical Education and Recreation* Tex Woman's U
- Hearing* Wash U (see Speech)
- Hearing Disorders* U of Pittsburgh (see Speech)
- Hebrew* Hebrew U Col
- Hebrew and Semitic Studies* Dropsie Col
- Higher Education* Pa State U
- Hispanic* Columbia U
- Hispanic American Studies* Stanford U
- Hispanic Languages and Literature* U of Calif
- History* (See Note on page 323)
- History and American Literature* Johns Hopkins U
- History and Government* Lehigh U
- History and Philosophy of Religion* Harvard U
- History of Art* Bryn Mawr Col U of Calif Yale U
- History of Culture* U of Chicago
- History of Economic Thought* N Y U (see Economic Theory)
- History of Mathematics* Brown U
- History of Music* Yale U
- History of Science* U of Wis
- History of Science and Learning* Harvard U
- History of the Theatre* Yale U
- Home Administration* Oreg State Col (see Family Life)
- Home Economics* U of Calif Fla State U U of Minn U of Mo Ohio State U Syracuse U Western Reserve U U of Wis
- Home Economics Education* Cornell U, Iowa State Col Pa State U Tex Woman's U
- Home Management* Tex Woman's U
- Home Management and Family Economy* Pa State U
- Horticultural Science* U of Calif
- Horticulture* U of Ariz U of Ill, Iowa State Col La State U, U of Md Mich State U, U of Minn U of Mo, Oreg State Col, Pa State U Purdue U, Rutgers U, A & M Col of Tex, Utah State U State Col of Wash U of Wis
- Horticulture and Forestry* Ohio State U
- Hospital Administration* State U of Iowa
- Hotel Administration* Cornell U
- Household Equipment* Iowa State Col
- Household Management* Cornell U (see Economics of the Household)
- Housing and Design* Cornell U
- Human Development* U of Chicago
- Human Genetics* Johns Hopkins U
- Humanistic Studies* Johns Hopkins U
- Humanities* Fla State U, Stanford U
- Humanities for College Teaching* Syracuse U
- Human Variation* Columbia U
- Hydraulics* State U of Iowa (see Mechanics)
- Immunology* U of Minn (see Bacteriology), U of N C, U of Pa Tulane U
- Indian Studies* Harvard U (see Sanskrit)
- Indic and Far Eastern Languages and Literatures* Yale U
- Industrial Administration* Carnegie Inst Tech
- Industrial and Labor Relations* Cornell U
- Industrial and Management Engineering* State U of Iowa
- Industrial Engineering* Columbia U, Ill Inst Tech Iowa State Col U of Mich U of Minn Ohio State U, Pa State U Stanford U
- Industrial Management* Johns Hopkins U (see Business)
- Industrial Organization and Control* N Y U
- Industrial Relations* N Y U (see Labor Problems), U of N C.
- Infectious Diseases* U of Calif
- Inorganic Chemistry* U of Minn
- Institution Administration* Tex Woman's U
- Institution Management* Iowa State Col
- Instrumentation Engineering* U of Mich
- Inter American Studies* U of Fla
- Internal Medicine* U of Cincinnati
- International Finance and International Trade* N Y U
- International Relations* American U Clark U Georgetown U, U of Minn U of Pa Syracuse U Yale U
- International Studies* Johns Hopkins U
- International Trade* N Y U (see International Finance)
- Investments* N Y U (see Corporation Finance)
- Irrigation Engineering* U of Calif Colo State U Utah State U
- Israel and the Middle East* Dropsie Col
- Italian* Bryn Mawr Col Columbia U U of Ill (see Spanish), Ind U (see French) U of Southern Calif U of Wis (see French)
- Japanese* Columbia U (see Chinese)
- Journalism* State U of Iowa U of Minn U of

- Mo, Northwestern U, Stanford U (see Communications), Syracuse U, U of Wis
- Labor and Management* State U of Iowa
- Laboratory Medicine* U of Colo (see Pathology)
- Labor Problems and Industrial Relations* NYU
- Labor Relations* Cornell U (see Industrial and Labor Relations)
- Land Economics* NYU (see Real Estate)
- Languages* U of Utah.
- Languages and Literatures* George Washington U
- Latin* Bryn Mawr Col, Columbia U (see Greek), U of Minn
- Latin American Studies* U of Calif, Ind U, U of Tex
- Law* George Washington U
- Liberal Arts* Emory U
- Librarianship* U of Calif
- Library Science* U of Ill, U of Mich, Western Reserve U
- Limnology* Cornell U (see Entomology and Limnology)
- Linguistics* U of Calif, U of Chicago, Columbia U, Harvard U, Ind U, La State U, U of Mich, U of Pa, U of Wash, U of Wis, Yale U
- Literatures* George Washington U (see Languages)
- Management* State U of Iowa (see Labor), St Louis U
- Management Engineering* State U of Iowa (see Industrial Engineering)
- Marine Engineering* U of Mich
- Marketing* State U of Iowa
- Mass Communications* U of Ill
- Materials* U of Minn (see Mechanics)
- Mathematical Biology* U of Chicago
- Mathematical Statistics* Columbia U
- Mathematics* (See Note on page 323)
- Mathematics and Astronomy* State U of Iowa
- Measurements* U of Nebr (see Educational Psychology)
- Mechanical Engineering* Poly Inst of Brooklyn, Calif Inst Tech (see Civil, Mechanical Engineering, and Applied Mechanics), U of Calif, Carnegie Inst Tech, Case Inst Tech, Columbia U, Cornell U, Ga Inst Tech, Ill Inst Tech, U of Ill, Iowa State Col, State U of Iowa, Kans State Col, Lehigh U, U of Md, Mich State U, U of Mich, U of Minn, Northwestern U, Ohio State U, Oreg State Col, Pa State U, U of Pittsburgh, Princeton U, Purdue U, Stanford U, A & M Col of Tex, U of Tex, U of Wis, Yale U
- Mechanics* Ill Inst Tech, Rensselaer Poly Inst
- Mechanics and Hydraulics* State U of Iowa
- Mechanics and Materials* U of Minn
- Mechanics Engineering* U of Wis
- Medical Microbiology* Ind U, U of Kans, U of Pa, U of Southern Calif, Stanford U, Wayne State U, U of Wis
- Medical Pharmacology* U of Kans
- Medical Physics* U of Calif
- Medical Science* Harvard U, U of Nebr, U of Oreg
- Medical Sciences* U of Louisville, U of Okla
- Medicine* U of Chicago, U of Colo, U of Fla, U of Minn, Ohio State U
- Medieval Institute* U of Notre Dame.
- Medieval Studies* Yale U
- Metallurgical Engineering* Carnegie Inst Tech, U of Cincinnati, Columbia U (see Mining), Cornell U, Ill Inst Tech, U of Ill (see Mining), U of Ky, Lehigh U, Mich State U, U of Mich (see Chemical Engineering), U of Minn, U of Mo, Ohio State U, U of Pa, U of Pittsburgh, Purdue U, Rensselaer Poly Inst, Stanford U, U of Utah, U of Wis
- Metallurgy* U of Calif, Case Inst Tech, Iowa State Col, Northwestern U, U of Notre Dame, Pa State U, U of Tenn, Yale U
- Meteorology* U of Ariz, U of Calif, U of Chicago, Fla State U, Mass Inst Tech, Pa State U, U of Wis
- Meteorology and Climatology* U of Wash.
- Meteorology and Fluid Mechanics* Johns Hopkins U
- Meteorology and Oceanography* NYU
- Microbiology* Baylor U, Boston U, U of Calif, U of Chicago, U of Cincinnati, U of Colo, Columbia U, Duke U, La State U, Loyola U, U of Md, U of Mo State U of N Y, Rutgers U, St Louis U, Temple U, Tulane U, Vanderbilt U, U of Va, U of Wash, Wash U, Western Reserve U, Yale U
- Microbiology and Public Health* Mich State U
- Middle East* Dropsie Col (see Israel)
- Middle Eastern Studies* Harvard U
- Middle East Languages* Columbia U (see Near East Languages)
- Milling Industry* Kans State Col.
- Mineral Economics* Pa State U
- Mineral Engineering* Columbia U (see Mining), Stanford U

- Mineral Industries* N C State Col
Mineralogy U of Colo, U of Mich, Ohio State U, Pa State U, U of Utah
Mineral Preparation Pa State U
Mining U of Calif
Mining and Metallurgical Engineering U of Ill, U of Wis
Mining Engineering U of Mo, Pa State U, U of Utah
Mining, Metallurgical and Mineral Engineering Columbia U
Modern and Classical Languages U of N Mex
Modern Foreign Languages Middlebury Col
Modern Languages Brown U (see Romance Languages, etc), Fla State U, U of Okla, U of Pittsburgh, Wayne State U
Modern Languages and Literatures U of Colo, Princeton U
Money and Banking N Y U
Music Boston U, U of Calif Catholic U, U of Chicago, Columbia U, Cornell U, Fla State U, George Peabody Col, Harvard U, U of Ill, Ind U, State U of Iowa, Mich State U, U of Mich, U of Minn, N Y U, U of N C, North Tex State Col, Northwestern U, U of Pa Princeton U, U of Southern Calif, Stanford U, U of Utah, U of Wash, Wash U, Western Reserve U, U of Wis
Music (Composition) U of Rochester
Music Education U of Kans, Pa State U
Music (Music Education) U of Rochester
Music (Musicology) U of Rochester
Music (Theory) U of Rochester
Natural Gas Engineering Pa State U
Naval Architecture and Marine Engineering U of Mich
Near and Middle East Languages Columbia U
Near Eastern Languages U of Calif
Near Eastern Languages and Literatures Yale U
Near Eastern Studies U of Mich
Neurology U of Minn
Neurosurgery U of Minn
New Testament Boston U
Nuclear Engineering U of Mich
Nursing Education U of Chicago, U of Pittsburgh, Tex Woman's U (see Child Development)
Nutrition U of Calif, Cornell U (see Food), Iowa State Col (see Foods), Kans State Col (see Foods), U of N C (see Biochemistry), Oreg State Col (see Foods), Pa State U, Purdue U (see Foods), U of Southern Calif (see Biochemistry), A & M Col of Tex (see Biochemistry), Tex Woman's U (see Foods), Utah State U (see Biochemistry), W Va U (see Agricultural Biochemistry)
Nutrition and Internal Medicine State U of Iowa
Obstetrics and Gynecology U of Chicago, U of Colo, U of Minn
Oceanography U of Calif, Fla State U, Johns Hopkins U, N Y U (see Meteorology), A & M Col of Tex, U of Wash
Office Management and Business Education State U of Iowa
Old Testament Boston U
Oncology U of Wis
Ophthalmology U of Minn
Optics U of Rochester
Optometry (Physiological Optics) Ohio State U
Organic Chemistry U of Minn
Oriental Languages U of Calif
Oriental Languages and Literatures U of Chicago
Oriental Seminary Johns Hopkins U
Oriental Studies U of Pa, Princeton U
Ornamental Horticulture Cornell U (see Floriculture)
Orthopedic Surgery U of Minn
Otolaryngology U of Minn
Palaeontology U of Calif, U of Colo
Parasitology Columbia U, Kans State Col, U of Pa, Tulane U
Pathology Boston U, U of Chicago, U of Cincinnati U of Colo, Columbia U, U of Mich, U of Minn U of Mo, N Y U, Northwestern U, Ohio State U, U of Pa, U of Rochester, St Louis U, Wash U, Western Reserve U, U of Wis
Pediatrics U of Chicago, U of Colo, U of Minn
Petroleum and Natural Gas Engineering Pa State U
Petroleum Engineering U of Calif, Stanford U, A & M Col of Tex U of Tex
Pharmaceutical Chemistry U of Calif, U of Fla, U of Kans, U of Mich, U of Minn
Pharmaceutical Science U of Nebr
Pharmacognostic Pharmacology U of Minn (see Pharmacognosy)
Pharmacognosy U of Fla
Pharmacognosy and Pharmacognostic Pharmacology U of Minn
Pharmacology U of Ala, U of Ark, Baylor U, Boston U, U of Buffalo, U of Calif, U of Chi

- cago, U of Cincinnati, U of Colo, Columbia U, U of Fla, George Washington U, State U of Iowa, La State U, Loyola U, U of Md, U of Mich, U of Minn, U of Mo (see Physiology), U of Nebr, State U of N Y, U of N Dak, Northwestern U, Okla State U (see Physiology), U of Pa, U of Rochester, St Louis U, Stanford U, Temple U, Tufts U, Tulane U, U of Utah, Vanderbilt U, U of Va, U of Wash, Wash U, U of Wis, Yale U
- Pharmacology and Toxicology* U of Southern Calif
- Pharmacy* U of Buffalo, U of Colo, U of Conn, U of Fla, State U of Iowa, U of Md, Mass Col of Pharmacy, U of N C, Ohio State U, Oreg State Col, U of Pittsburgh, Purdue U, U of Southern Calif, Temple U, U of Tex, State Col of Wash, U of Wash, U of Wis
- Philosophy* (See Note on page 323)
- Philosophy of Education* Boston U
- Philosophy of Religion* Boston U (see Systematic Theology), Harvard U (see History of Religion)
- Physical Chemistry* U of Minn
- Physical Education* U of Ill, La State U (see Health Education), U of Md, Ohio State U, U of Oreg, Pa State U, U of Southern Calif, Tex Woman's U (see Health), State Col of Wash, U of Wis
- Physical Education—Men* State U of Iowa
- Physical Education—Women* State U of Iowa
- Physical Medicine and Rehabilitation* U of Colo, U of Minn
- Physical Sciences* Inst of Paper Chem, Miss State Col (see Engineering and Physical Sciences), State U of N Y
- Physics* (See Note on page 323)
- Physics and Astronomy* Ohio State U, U of Rochester, Vanderbilt U
- Physiological Chemistry* U of Calif, Johns Hopkins U, U of Minn, Ohio State U, Temple U, Wayne State U, U of Wis
- Physiological Hygiene* U of Minn
- Physiological Optics* U of Calif (see Optometry), Ind U
- Physiological Sciences* N Y U
- Physiology* U of Ala, Baylor U Boston U, U of Buffalo, U of Calif, U of Chicago, U of Cincinnati, U of Colo, Columbia U, Duke U, Fla State U, George Washington U, U of Ill, Ind U, State U of Iowa, Johns Hopkins U, U of Kans, La State U, U of Louisville, Loyola U, U of Md, Mich State U, U of Mich, U of Minn, State U of N Y, U of Nebr, U of N C, U of N Dak, Northwestern U, Ohio State U, U of Pa, U of Rochester, Rutgers U, St Louis U, U of Southern Calif, Stanford U, Temple U, Tufts U, Tulane U, Vanderbilt U, U of Va, Wash U, W Va U, U of Wis, U of Wyo (see Zoology), Yale U
- Physiology and Biophysics* U of Wash
- Physiology and Pharmacology* U of Mo, U of Nebr, Okla State U
- Physiology Pharmacology* Wayne State U
- Planning and Housing* Columbia U (see Architecture)
- Plant Botany* U of Minn (see Plant Pathology)
- Plant Breeding* Cornell U
- Plant Genetics* U of Minn
- Plant Pathology* U of Ariz, U of Calif, Cornell U, U of Fla, U of Ill, La State U (see Botany), Mich State U (see Botany), N C State Col, Ohio State U (see Botany), Pa State U, Purdue U (see Botany), Rutgers U, Utah State U (see Botany), State Col of Wash, W Va U, U of Wis
- Plant Pathology and Botany* U of Minn
- Plant Physiology* Purdue U, Rutgers U
- Plant Physiology and Pathology* A & M Col of Tex
- Plant Sciences* U of Ga, Miss State Col, U of Okla, Purdue U
- Political Economy* Johns Hopkins U, N Y U
- Political Economy and Government* Harvard U
- Political Philosophy and Social Science* Fordham U
- Political Science* U of Ala (see Government), Brown U, Bryn Mawr Col, U of Calif, U of Chicago, U of Cincinnati, U of Colo, Duke U, Emory U, U of Fla, Harvard U, U of Ill, State U of Iowa, Johns Hopkins U, U of Kans, U of Ky, Mich State U, U of Mich, U of Minn, U of Nebr, New Sch Soc Research, U of N C, Northwestern U, U of Notre Dame, Ohio State U, U of Oreg, Pa State U, U of Pa, U of Pittsburgh, Rutgers U, St John's U, U of Southern Calif, Stanford U, Syracuse U, U of Tenn, Tulane U, U of Utah, Vanderbilt U, U of Va, State Col of Wash, U of Wash, Wash U, Western Reserve U, U of Wis, Yale U
- Politics* Catholic U, U of Md (see Government), Princeton U

- Pomology* Cornell U
Portuguese U of Ill (see Spanish), Ind U (see Spanish), U of Wis (see Spanish)
Poultry Rutgers U
Poultry Husbandry Ala Poly Inst, Cornell U, Iowa State Col, U of Md, Mich State U, U of Minn, U of Mo, Oreg State Col, Pa State U, U of Wis
Poultry Industry La State U
Poultry Science U of Conn, Ohio State U, Purdue U, A & M Col of Tex
Preventive Medicine and Public Health U of Okla
Proctology U of Minn
Psychiatry Catholic U (see Psychology and Psychiatry), U of Colo, George Washington U, U of Minn
Psychology (See Note on page 323)
Psychology and Psychiatry Catholic U
Public Administration Cornell U (see Business and Public Administration), N Y U
Public Finance and Taxation N Y U
Public Health Mich State U (see Microbiology) U of N C, U of Okla (see Preventive Medicine), U of Pittsburgh, Yale U
Public Health Economics U of Mich
Public Health Statistics U of Mich
Public Law and Government Columbia U
Radiation Biology U of Tenn
Radiology U of Colo, U of Minn
Range and Forestry A & M Col of Tex
Range Management U of Ariz, Utah State U
Real Estate and Land Economics N Y U
Recreation Tex Woman's U (see Health and Physical Education)
Recreation Administration Tex Woman's U (see Recreation)
Recreation Education Pa State U
Recreation or Recreation Administration Tex Woman's U
Regional Science U of Pa (see City Planning)
Rehabilitation U of Colo (see Physical Medicine), U of Minn (see Physical Medicine)
Religion Columbia U, Duke U, State U of Iowa, Princeton U, U of Southern Calif, Union Theol Sem, Vanderbilt U, Western Reserve U, Yale U
Religion and Related Areas Hartford Sem Foundation
Religious Education Catholic U
Religious Studies Brown U
Resource Management State U of N Y.
Romance Languages Catholic U (see Modern Languages, etc), U of Cincinnati, Duke U, Fordham U, State U of Iowa, Johns Hopkins U, U of Kans, U of Minn, N Y U, U of N C, Northwestern U, Ohio State U, U of Oreg, U of Pa, Rice Inst, Syracuse U, U of Tex, U of Va, Wash U, Western Reserve U
Romance Languages and Literatures U of Calif, U of Chicago, Harvard U, U of Mich, U of Nebr, Pa State U, U of Wash, Yale U
Romance Literatures U of Calif
Romance Philology U of Calif
Romance Philology and French Columbia U
Romance Studies Cornell U
Rural Education Cornell U (see Education and Rural Education)
Rural Sociology Cornell U, Ohio State U (see Agricultural Economics), Pa State U, U of Wis
Russian Cornell U
Sacred Theology St Mary's Col
Sanitary Chemistry U of Wis
Sanitary Engineering Va Poly Inst
Sanitation Rutgers U
Sanskrit and Indian Studies Harvard U
School Administration U of Nebr
Science College Teaching Syracuse U
Secondary Education U of Nebr, U of Utah
Seed Technology Cornell U
Semitic Languages Catholic U, Hebrew U Col
Semitic Languages and History Harvard U
Semitic Studies Dropsie Col (see Hebrew)
Slavic and Baltic Studies U of Pa
Slavic Languages Columbia U
Slavic Languages and Literatures U of Calif, Harvard U, U of Wash (see Far Eastern)
Slavic Studies U of Calif
Social Administration Ohio State U
Social Ethics and Sociology of Religion Boston U
Social Institutions U of Calif (see Sociology and Sociology Institutions)
Social Psychology Columbia U, U of Mich
Social Relations Harvard U
Social Science Fordham U (see Political Philosophy), St John's U Yale U
Social Thought U of Chicago
Social Work Bryn Mawr Col, U of Minn.
Sociology Brown U, Bryn Mawr Col, U of Buffalo, U of Calif (see Anthropology Sociology), Catholic U, U of Chicago, Clark U, U of Colo, Columbia U, U of Conn, Duke U,

- Fla State U, U of Ill, Ind U, U of Kans, U of Ky, La State U, U of Md, U of Mich, U of Minn, U of Nebr, New Sch Soc Research, N Y U, Northwestern U, U of Notre Dame, U of Oreg, Pa State U, U of Pa, U of Pittsburgh, Princeton U (see Economics), Purdue U, U of Rochester, St Louis U, U of Southern Calif, Stanford U, U of Tex, Tufts U, Tulane U, U of Utah, Utah State U, Vanderbilt U, State Col of Wash, U of Wash, Wayne State U, Yale U
- Sociology and Anthropology* American U, Cornell U, State U of Iowa, Mich State U, U of Mo, U of N C, Ohio State U, Syracuse U, U of Wis
- Sociology and Social Institutions* U of Calif
- Sociology Anthropology* Wash U
- Sociology (Latin American)* U of Fla
- Sociology of Religion* Boston U (see Social Ethics)
- Soils* U of Ariz, U of Fla, U of Hawaii, U of Minn, N C State Col, Oreg State Col, Rutgers U, U of Wis
- Soil Science* U of Calif, Mich State U
- Solid State Science and Technology* Syracuse U
- South Asia Regional Studies* U of Pa
- Soviet and East European Studies Program* U of Notre Dame
- Spanish* Bryn Mawr Col, U of Fla, U of Minn, U of Mo, Tulane U
- Spanish and Italian* U of Southern Calif
- Spanish and Portuguese* Ind U, U of Wis
- Spanish, Italian and Portuguese* U of Ill
- Spanish Languages and Literatures* U of Mo
- Speech* U of Colo, U of Denver, Fla State U, U of Fla, U of Ill, La State U, Mich State U, U of Mich, Ohio State U, U of Okla, Pa State U, Purdue U, U of Southern Calif, U of Utah, U of Wash, Wayne State U, Western Reserve U, U of Wis
- Speech and Drama* Cornell U, Stanford U
- Speech and Dramatic Art* State U of Iowa, U of Mo.
- Speech and Hearing* Wash U
- Speech and Hearing Disorders* U of Pittsburgh
- Speech and Theatre* Ind U
- Speech and Theatre Arts* U of Minn.
- Speech (Correction and Audiology)* Northwestern U
- Speech (Education)* Northwestern U
- Speech (Interpretation)* Northwestern U
- Speech Pathology* U of Minn, Syracuse U (see Audiology)
- Speech Pathology and Audiology* Stanford U
- Speech (Public Speaking)* Northwestern U
- Speech (Radio, Television and Film)* Northwestern U
- Speech (Theatre)* Northwestern U
- Statistics* Amencio U, U of Calif, U of Chicago, Cornell U, George Washington U, Iowa State Col, U of Minn, U of Mo, N Y U, U of N C, Stanford U, Va Poly Inst, Yale U
- Study of Human Growth* U of Colo
- Study of Methods* U of Chicago (see Analysis of Ideas)
- Surgery* U of Chicago, U of Colo, U of Minn
- Syphilology* U of Minn (see Dermatology)
- Systematic Theology and Philosophy of Religion* Boston U
- Tanning Research* U of Cincinnati
- Taxation* N Y U
- Taxonomy* George Washington U
- Teaching College Subjects* Wayne State U
- Textiles* Pa State U (see Clothing)
- Textiles and Textile Technology* Tex Woman's U
- Textile Technology* Tex Woman's U (see Textiles)
- Theatre* U of Denver, Ind U (see Speech), Northwestern U (see Speech)
- Theatre Arts* U of Minn (see Speech)
- Theological Studies* Drew U
- Theoretical and Applied Mechanics* U of Ill, Iowa State Col
- Toxicology* U of Calif (see Comparative Pharmacology), U of Southern Calif (see Pharmacology)
- Uralic and Altaic Languages* Columbia U
- Urology* U of Minn
- Vegetable Crops* Cornell U, U of Fla
- Veterinary Anatomy* U of Minn, Ohio State U
- Veterinary Bacteriology* U of Minn
- Veterinary Medicine* Cornell U, U of Minn, Ohio State U
- Veterinary Parasitology* U of Minn, Ohio State U, Okla State U
- Veterinary Pathology* Mich State U, U of Minn, Ohio State U, A & M Col of Tex.
- Veterinary Pharmacology* U of Minn (see Veterinary Physiology), Ohio State U (see Veterinary Physiology)
- Veterinary Physiology and Pharmacology* U of Minn, Ohio State U

Veterinary Preventive Medicine Ohio State U
Veterinary Science U of Ill, Purdue U, State Col
of Wash, U of Wis
Veterinary Surgery Ohio State U
Virology U of Pa
Vocational Agricultural Education La State U
Vocational Education Iowa State Col
Wildlife Management U of Ariz, U of Mich
A & M Col of Tex, Utah State U, U of Wis
(see Forestry)
Wood Technology U of Mich
Zoology Ala Poly Inst, U of Calif, U of Chi
cago, U of Cincinnati, Colo State U, Colum

bia U, U of Conn Cornell U, Duke U, Fla
State U, George Washington U, U of Ga, U
of Hawaii, U of Ill Ind U, Iowa State Col,
State U of Iowa U of Kans, La State U,
U of Md, U of Mass, Mich State U, U of
Mich, U of Minn, U of Mo, U of Nebr, N C
State Col, U of N C, Okla State U, U of
Okla, Oreg State Col, U of Pa, Purdue U,
Rutgers U, Syracuse U, U of Tenn, U of
Tex, Tulane U, U of Utah Utah State U,
State Col of Wash, U of Wash, Wash U, U
of Wis, U of Wyo, Yale U
Zoology and Entomology Ohio State U